THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Rooms—No. 39 Nassau Street, cor. Liberty Street, opposite the Post-Office, New York.

VOL. V.—No. 101. NEW YORK, TUESDAY, MARCH 1, 1864. $3 PER ANNUM.

ON SUPPLYING GAS TO STREET LAMPS.*

We have given a sufficient number of extracts from the English technical journals on the subject of supplying gas to street lamps, to show the interest which is now being felt in the question, and that the leading writers on gas are employing their pens in its discussion. We are indebted to J. O. N. Rutter, Esq., of Black Rock, Brighton, for a copy of his pamphlet on this subject, in which that well-known author considers the question in all its details, and comes out decidedly in favor of the meter system, and where it is impracable to have a meter for every street lamp, the average meter system is advocated.

There is, probably, no man in England, who has had a wider experience in gas matters than Mr. Rutter. The widely circulated writings of this gentleman evince a thorough acquaintance with the various details of his subjects, and his long experience in the practical management of gas-works entitles his opinions to much respect and consideration.

In the pamphlet before us, from which we shall make several quotations, Mr. Rutter contends that the meter is the only effectual remedy for the antagonisms of the contract system. Although the relations of gas companies and the public authorities are somewhat different in England and this country, still the same line of argument may be used here, and all that he has said in favor of meter indications for street lamps, may, with as much propriety, be urged here. The same contract system is observed here, and the same disputes are experienced. Without further comment we quote as follows from the pamphlet:

"For the errors, the dissatisfactions, and the antagonisms of the contract system there is no remedy so simple, none so effective, as the METER. Why is its adoption delayed, and by whom is it opposed—the gas companies, or the public authorities? Both parties are blameable. Instead of standing at a distance, and finding fault with each other, would it not be better to work together, and by interchanges of information, and prompt and friendly explanations, to settle present, and remove all causes for future, differences? This is the way—the only right way—to wipe out the remembrance of old grievances, and to establish feelings of mutual respect and confidence; the same habits of plain speaking and plain dealing which exist among other classes of buyers and sellers. It will come to this by-and by. It ought to have been so long ago."

* * * * *

"Looked at in any one of its numerous phases, not a word can be said in favor of the continuance of the contract system. When more gas is used than is contracted for, it is injustice to the companies and to their other customers; gas being given away to one class and sold at a higher price than it would otherwise need to be to another. When less than the quantity agreed for is consumed, the ratepayers are wronged; as they pay for more gas than they receive, and at a proportionately greater price. Either way, so long as the quantity is unknown the price charged, be it what it may, is not a *fair* price.

"Will the use of meters, in supplying gas to street lamps, be an experiment in gas-lighting? Is there anything doubtful or difficult about it to account for the opposition which the proposed change has met with? Certainly not. It would be only making general what is now partial; and in giving full effect to the meter system gas companies would be strengthened where it is most needed, and in what have always been their weakest parts. The sale of gas by meter has been one of the principal causes of the great success of gas-lighting. Its capabilities will not be fully developed, its freedom of action perfectly established, nor the real commercial value of gas ascertained, so long as there is a fixed standard for charging it to one class of customers, and a variable standard for another.

"In applying the meter system to street lamps, the right principle is a meter to each lamp. There is no necessity for discussion nor disputation about that. But the question may very properly be asked, whether it may not be possible, by a series of averages, to satisfy both parties as to the rate of consumption? The plan has been tried, and it has succeeded; and if viewed only as a temporary arrangement, and yielding something for the sake of mutual accommodation, it deserves further trial and fair treatment. If care be taken in fitting the lamps with suitable taps and burners, and the adjustments be made according to situations and other local requirements, the averages obtained from meters—say one to every fifth or tenth lamp—will be a wide separation from a wrong principle, and a close approximation to a right one. A great amount of good might be done, much valuable information acquired, and many old-fashioned prejudices got rid of, by hearty co-operation in giving effect to the meter average system. Who have found most fault with it—those who have tried it, or those who know nothing about it? The latter have been most active in their opposition. This is no more than was to be expected; for there are some people to whom it is easier, and, apparently, pleasanter to condemn than to commend.

"In connection with meter averages so much has lately been said about the rates of consumption of 'metered' and 'unmetered' lamps, that it might have been expected there was some new and hitherto unknown principle to be illustrated, or something to be made intelligible which had not before been understood. The discussion has only helped to mystify what had never been doubted, and to surround with difficulties what had always been sufficiently plain.

"Have we now to learn that variable degrees of pressure produce variable rates of consumption? What have lamp-lighters been about from the earliest days of gas-lighting, but contending with this law and doing their utmost to control its operations? By rule-of thumb—the hand, the eye, and the judgment—they make all sorts of adjustments to compensate for inequalities of pressure occasioned by differences of levels and other causes. Wherein consists the difficulty, or the mystery, in making similar adjustments for lamps with or without meters? Under any circumstances, whether gas be supplied and charged for by averages of meters, or by a meter to each lamp, the skill and attention of lamp-lighters will still be indispensable. Whatever the amount of care bestowed upon adjusted taps and tested burners, they will not do everything that will be required. The sale of gas is based upon a series of averages, which have a narrower or wider range according to differences of pressure.

"In supplying lamps by contract the object aimed at is that, during the periods of greatest pressures the supply shall be so much in excess of the mean (stipulated) averages as shall compensate for the deficiency during the periods of least pressures. If at the periods of greatest pressures the quantity of gas passing the burners be no greater than the maximum of the rate contracted for, the conditions of the contract are not complied with. It is impossible that equal quantities can pass a burner in equal times with unequal pressures."

In order to give the full force of Mr. Rutter's argument, we ought to quote his pamphlet entire, but our limited space forbids this. We that think every candid gas-engineer must fully agree with the author, that the contract system is doomed, and that meters must be attached to the public lamps and the amount of gas consumed be determined by these instruments alone. Then by "effort, intention, and co-operation in trying to secure success," one great point of contention will be overcome, and much more satisfactory results arrived at. The streets will be better lighted and the public authorities and the gas companies will come to a better understanding than will ever be experienced under the contract system.

Mr. Rutter's pamphlet is written in a terse, vigorous and elegant style, and will amply repay a careful perusal. He has treated his subject with great fairness, and we only regret that we have not space to give the whole of it to our readers instead of presenting them with mere extracts.

* *On Supplying Gas to Street Lamps. By J. O. N. Rutter, F.R.A.S. Brighton: Printed for the Author.* 1864.

COMPRESSIBILITY OF COAL-OIL GAS.

Prof. Lesley, in the report of the Commissioner of Agriculture, writes as follows concerning coal-oil gas:

The compressibility of coal-oil gas is one of its most dangerous qualities, increasing indefinitely the dangers of those explosions which annually cost so many valuable lives. Confined in the walls of the gangways and rooms, it issues from innumerable cells or pockets, the larger of which are called "blowers;" sometimes with the noise of heavy rain; sometimes with small reports. It collects among the timbers of the roof, in the upper galleries of the mine, in deserted portions of the colliery, and especially in those accumulations of refuse coal and slate, called "gob," or "goaf," with which the miners pillar up the superincumbent rocks. These acres of worked-out and filled-up galleries become vast reservoirs of fire-damp. The gas collects especially over the anticlinal rolls. From these great powder-magazines, solicited by the least diminution of barometric pressure in the atmosphere, the gas rushes out to fill the working-rooms. Long experience has shown that a falling barometer and explosions in coal-mines always go together. But the mischief is accumulative. The vaccuum produced by the first explosion is a new provocation to the world of back gas to leave its hiding-places, come forward afresh, and produce another, and again another, until the proportion of air to gas becomes too small to make an explosive mixture; so that, like the stroke of lightning, the coal-mine explosion is not a unit, but a series, cause and effect reciprocally acting to produce the last result.

HOTEL ELEVATORS.—It appears from the proceedings of the Institute of British Architects, that the principle of hydraulic lifts is being successfully applied in the place of steam-power in many cases. The Brighton Hotel contains a machine which, moved by the weight of water with a sufficient head, raises the visitors and luggage from the lower story to the upper, which is seventy-seven feet from the ground. The elevator in the Fifth Avenue Hotel is operated by steam. At the Grand Hotel in Paris, the elevators are put in motion by means of Lenoir's gas-engine, which is said to perform its office with economy and cleanliness, and requires very little attention.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1846	AKRON	O.	29,000	33⅓	—	Do.	3,500	3 00	....	....	
1845	ALBANY	N. Y.	250,000	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	106,780	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1858	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	150,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	8	Do.	9,000	6 00	....	....	
1858	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	...	
1860	AURORA	Ind.	10,000	—	—	Private Works.	3 500	3 50	....	...	Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1817	BALTIMORE	Md.	550,000	100	5	June & December.	150,000	2 50	150	....	None for sale.
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1858	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	...	...	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	...	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1856	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10 000	4 00	....	....	
1850	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	....	....	
1858	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	130,000	2 25	....	....	
1850	BRATTLEBORO'	Vt.	21,000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	...	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	25,000	50	2	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1858	BROOKLINE	Mass.	66,000	100	3½	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1853	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	3 50	....	...	
1852	CAMBRIDGE	Mass.	300,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 85	105	100	
1858	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	8,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1858	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	....	Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	...	...	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	30,000	25	—	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	728,800	25	4	Do.	50,000	4 00	....	....	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	....	....	
1858	CHARLOTTE	N. C.	14,000	50	10	March & September.	3,500	6 00	....	....	
1850	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	...	
1851	CHELSEA	Mass.	100,000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,800,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	185,000	3 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—				....	....	
	CLARKSVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20,000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	...	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	...	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 60	....	....	
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	95	....	Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	....	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1858	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30.000	3 00	....	....	
1858	CONCORD	N. H.	50,000	50	5	Do.	8,000	3 50	....	....	
1858	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	...	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	...	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3,000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	.. .	
1853	DEDHAM	Mass.	40,000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellent Stock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,000	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3,000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	3½	Do.	17,000	4 50	.....	115	This stock is wanted at par.
1856	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	No transactions.
1856	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	...	
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1859	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	...	
1853	ERIE	Pa.	68,000	50	3½	June & December.	10 000	3 00	....	....	
1853	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	
	EXETER	N. H.	60,000	—	—	Do.	12,000		....	...	A very good Company.
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	76,000	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	....	
1857	FISHKILL	N Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1858	FITCHBURG	Mass.	160,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N J.	20,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00	....	....	
1858	FOLSOM	Cal.							....	....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6.000	4 00		....	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5.500	4 50	...	...	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2.000	4 00	....	....	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	FREMONT	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	FULTON	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
1855	GALENA	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	GALION	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	GALVESTON	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	GARDINER	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	GENEVA	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	GERMANTOWN	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	GETTYSBURG	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	GLENN'S FALLS	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	GLOUCESTER	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	GLOVERSVILLE	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	GRAND RAPIDS	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	GREAT BARRINGTON	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	GREAT FALLS	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	GREENFIELD	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	
1858	GREENPOINT	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	Close corporation.
1859	GREENSBORO'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	GREENSBURG	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	HAGERSTOWN	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
1859	HAMILTON	O.	15,000			Do.			....	....	
1857	HANNIBAL	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1855	HARLEM	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1849	HARRISBURG	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
	HARTFORD	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	Stock in demand.
1853	HASTINGS	N. Y.				Do.	8,000	4 00	....	....	
1859	HAVERHILL	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1861	HAVERSTRAW	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1859	HAVERSVILLE	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1862	HEMPSTEAD	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1856	HOBOKEN	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	Works not yet built.
1861	HOLLIDAYSBURG	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	
1861	HOLYOKE	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1854	HOMER & CORTLANDT	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1860	HONESDALE	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1858	HORNELLSVILLE	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
	HUDSON	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
1857	HUNTER'S POINT	N. Y.									
1856	HUNTINGTON	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
	HUNTSVILLE	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
1857	INDIANAPOLIS	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1852	IOWA CITY	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
	ITHACA	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	JACKSON	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	JACKSON	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	JACKSON	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	JACKSONVILLE	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	JACKSONVILLE	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	JACKSONVILLE	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	JAMAICA	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1853	JAMAICA PLAIN	Mass.	75,000	100	3½	Do.	3,000	3 50	....	....	
	JAMESTOWN	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	JANESVILLE	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	JEFFERSONVILLE	Md.	30,000	25		Do.	4,000	4 00	....	....	
1853	JERSEY CITY	N. J.	300,000	—	5	Do.	80,000	3 00	150	....	No sales since formation of Hoboken Co.
1858	JERSEY SHORE	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	
1856	JOHNSTOWN	Pa.	80,000	25	3	Do.	8,000	3 00	....	....	
1857	JOLIET	Ill	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	KALAMAZOO	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	KEENE	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	KEOKUK	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	KINGSTON	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	KITTANNING	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	Said to be a fraud.
1854	KNOXVILLE	Tenn.	63,000	—	—	April & October.	4,000	5 00	....	....	
1860	LACONIA	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	LA CROSSE CITY	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	Petroleum and Wood Gas.
1854	LAFAYETTE	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	LAMBERTVILLE	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	LANCASTER	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	LANCASTER	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	LANSINBURG	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	LAWRENCE	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	LEAVENWORTH	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	LEBANON	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	LE ROY	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	LEWISBURG	Pa.	20,000	100	—	January & July.	4,000	4 00	....	....	
1852	LEWISTON	Me.	100,000	100	3	Do	10,000	3 20	....	....	
1856	LEWISTOWN	Pa,	30,000	50	3	April & October.	3,000	3 10	....	....	
1853	LEXINGTON	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1858	LITTLE FALLS	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	LITTLE ROCK	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	LOCKHAVEN	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	LOCKPORT	N. Y.	100,000	50	—	Do.	4,000	4 00	....	....	
	LOGANSPORT	Ind.	40,000		5	April & October.	5,000	4 00	105		But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1838	LOUISVILLE	Ky.	600,000	50	6	January & July.	80,000	2 50	125	....	
1849	LOWELL	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	LYNCHBURG	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	LYNN	Mass.	55,000	50	4	Do.	20,000	4 00	....	....	
1859	LYONS	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	MACON	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	MADISON	Ind.	160,000	25	3	Do.	10,100	3 50	....	....	
1855	MADISON	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	MALDEN & MELROSE	Mass.	50,000	25	3	February & August.	5,000	4 00	....	....	
1852	MANAYUNK	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	MANCHESTER	N. H.	100,000	100	5	January & July.	25,000	3 00	....	....	
1830	MANHATTAN (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	MANSFIELD	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	MARBLEHEAD	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	MARLBORO'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	MAUCH CHUNK	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	MARIETTA	O.	50,000	50	—	Do.	7,000	4 00	....	....	Stock firm.
1860	MARION	O.	12,000	25	5	April & October.	1,500	18 55	....	....	
1858	MARTSVILLE	Cal.	50,000	100	—	January & July.	4,000	2 50	....	....	
1857	MASSILON	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	MEADVILLE	Pa.	39,500	25	—	Do.	4,000	3 50	....	....	
	MEDINA	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	MEMPHIS	Tenn.	300,000	100	5	June & December.	12,000	3 50	....	....	
	MERIDEN	Ct.	20,000			Do.			....	....	
1859	METROPOLITAN (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	MIDDLEBORO'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1858	MIDDLETOWN	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	Owned by G. T. Sutton.
	MIDDLETOWN	N. Y.		25	—	Private Works.	3,000	3 00	....	....	
	MILFORD	Mass.	20,000	—	—	Do.		4 00	....	....	
	MILLEDGEVILLE	Ga.	100,000	50	—	Do.		5 00	....	....	
	MILTON	Pa.	10,000			Do.			....	....	
1847	MILWAUKEE	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	MOBILE	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1836	MONROE	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	MONTGOMERY	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	MONTPELIER	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	MORRISANIA	N. Y.	30,000	50	—	Do.		4 00	....	....	
1859	MORRISTOWN	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	MOUNT HOLLY	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	MOUNT VERNON	O.	50,000	100	—	Do.		4 00	....	....	
1857	MUSCATINE	Iowa.	50,000	100	—	January & July.	3,000	4 50	....	....	
1854	NANTUCKET	Mass.	50,000	100	3	February & August.	6,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	NASHUA	N. H.	45,000	50	3½	January & July.	10,000	3 50	....	....	
1850	NASHVILLE	Tenn.	200,000	50	5	Do.	25,000	3 50	....	...	
1858	NATCHEZ	Miss.	46,000	50	—	Do.	20,000	5 00	...	...	
	NEVADA CITY	Cal.							....	....	
1852	NEW ALBANY	Ind.	200,000	50	3½	Do.	16,000	3 50	....	...	
1846	NEWARK	N. J.	362,000	50	5	Do.	45,000	3 62	130	...	Always a favorite stock.
1856	NEWARK	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	NEW BEDFORD	Mass.	130 000	100	5	Do.	15,000	2 90	102	.. .	Well managed and kept quiet.
1859	NEWBERN	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	NEW BRITAIN	Ct.	30,000	20	5	Do.	3,000	4 00	....	....	
1851	NEW BRUNSWICK	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	NEWBURG	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	NEWBURYPORT	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	NEWCASTLE	Del.	82,300	10	3	Do.	4,000	4 00	90	....	
1847	NEW HAVEN	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1853	NEW LONDON	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	NEW ORLEANS	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1858	NEWPORT	R. I.	130,200	100	4	Do.	10,000	3 50	112	....	
1854	NEWTON & WATERTOWN	Mass.	800.000	100	2	Do.	10,000	4 00	....	....	
	NEWTON	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	NEWTON	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
	NEWTOWN	N. Y.									
1828	NEW YORK	N. Y.	1,000.000	50	5	May & November.	100,000	2 50	300	....	
1859	NIAGARA FALLS	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	NORFOLK	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1858	NORRISTOWN	Pa.	41.700	25	4	June & December.	8,000	3 50	....	....	
1855	NORTH ATTLEBORO'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	NORTHERN LIBERTIES	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	NORTH ADAMS	Mass.	25,000	—	—	March & September.	30,000	4 00	....	..	
1856	NORTHAMPTON	Mass.	35,000	25	3	January & July.	4 500	4 00	....	....	
1859	NORTH BRIDGEWATER	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	NORWALK	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1859	NORWALK	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	NORWICH	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	NORWICH	N. Y.	12,000	50	—	Do.	2,500	4 00	....	. ..	
1859	NYACK	N. Y.	20.000	100	—	Do.	2,500	4 00	....	....	
1860	OBERLIN	O.	10,000	—	—	Do.	1,200	4 00	....	...	
1855	OGDENSBURG	N. Y.	75,000	50	5	Do.	9,000	4 00	....	.. .	
1859	ORANGE	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	OSWEGO	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	
1855	OTTAWA	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	Good works, built by Hoy, Jr., & Kennedy.
1856	OWEGO	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	OWENSBORO'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	PADUCAH	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	PAINSVILLE	O.	40,000	25	5	Do.	2,500	5 00	....	.. .	
1856	PALMYRA	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	PATERSON	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	PAWTUCKET	R. I.	75,000	50	4	Do.	12.000	3 00	....	....	
1855	PEEKSKILL	N. Y.	31,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	PENN YAN	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	PEOPLES', CHICAGO	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1855	PEORIA	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	PETERSBURG	Va.	120,000	—	5	January & July.	20,000	3 50	....	....	
1841	PHILADELPHIA	Pa.	3,000,000	50	—	City Works.	650.000	2 50	....	....	
1855	PIQUA	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	PITTSBURG	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	PITTSFIELD	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	PLACERVILLE	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	PLAINFIELD	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	PLATTSBURG	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1858	PLYMOUTH	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	PORT CHESTER	N. Y.	50,000	50	—	Do.	4,000	4 00	....		
1860	PORT JERVIS	N. Y.	20,000	100	—	Do.	3,000	4 10	....	....	
1849	PORTLAND	Me.	300,000	50	4	January & July	30,000	3 00	....	....	
1859	PORTLAND	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	PORT LAVACCA	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	PORTSMOUTH	N. H.	70,000	100	3	April & October.	6,500	3 70	....	....	
1855	PORTSMOUTH	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	PORTSMOUTH	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	POTTSTOWN	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	POTTSVILLE	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1850	POUGHKEEPSIE	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
1848	PROVIDENCE	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1858	QUINCY	Ill.	300.000	50	4	June & December.	12,000	3 50	....	....	
	QUINCY	Mass.	00,000	00	—	Do.	00,000	9 00	....	....	
1855	RACINE	Wis.	43,500	26	—	Do.	7,000	3 50	....	....	
1857	RAHWAY	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1858	RALEIGH	N. C.	25,000	100	6	May & Novrmber.	5,000	6 00	....	....	
1848	READING	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	RICHMOND	Va.	341.975	—	—	City Works.	30,000	3 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
1859	RICHMOND	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	
	RICHMOND COUNTY	N. Y.									
1859	RIPLEY	O.	25.000	50	—	April & October.	2,000	4 00	....	....	
1852	ROCHESTER	N. Y.	200,000	50	5	January & July.	50,000	2 50	....	....	
1857	ROCKFORD	Ill.	40,000	50	—	Do.	4,000	4 00	....	...	
1854	ROCK ISLAND	Ill.	100.000	50	—	Do.	6,000	4 50	....	....	
1854	ROCKLAND	Me.	50,000	100	—	Do.	6,000	4 40	....	.. .	
1853	ROME	N. Y.	35,000	100	3½	Do.	10,000	3 60	....	....	
1854	RONDOUT and KINGSTON	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	ROXBURY	Mass.	150,000	100	5	January & July.	20,000	3 50	....	....	
1859	RUTLAND	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	SACO	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
857	SACRAMENTO	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	SAG HARBOR	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	SAINT ALBANS	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	SAINT JOHNSBURY	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	SAINT JOSEPH	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	SAINT LOUIS	Mo.	600.000	50	—	June & December.	180.000	3 50	....	....	
1857	SAINT PAUL	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	SALEM	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	SALEM	Mass.	200,000	100	4	February & August.	30,000	3 24	..	....	
1859	SALEM	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	SALISBURY	N. C.	14,600	50	6	May & November.	3,500	6 00	....	...	
	SALISBURY MILLS	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	SALMON FALLS	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	SAN ANTONIO	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	SANDUSKY	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	SANDWICH	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	SAN FRANCISCO	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	SAN JOSE	Cal.							....	....	
1853	SARATOGA SPRINGS	N. Y.	30,000	100	—	January & July.	6,000	3 60	70	....	
	SAUGERTIES	N. Y.	30,000	20	—	Do.	4,000	3 00	....	....	
1849	SAVANNAH	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	SCHENECTADY	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1856	SCRANTON, Gas and Water	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	
1857	SELMA	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	About trying Water-Gas.
1856	SENECA FALLS AND WATERLOO	N. Y.	30,000	50	3	Do.	10,000	4 00	100	....	
	SHREVEPORT	La.	40,000	25	—	Do.	3,000	0 50	....	....	
1856	SING SING	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	SMYRNA	Del.						4 00	....	....	
1860	SOUTH ADAMS	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	Petroleum Gas.
1854	SOUTH BRIDGE	Mass.	5,000	25	—	Do.	4,010	6 00	....	....	
	SOUTH BOSTON	Mass.	200.000	50	—	Do.	60.000	3 25	110	....	
	SPRINGFIELD	O.	200.000	100	—	Do	20,000	3 50	....	....	
1854	SPRINGFIELD	Ill.	75.000	50	—	January & July.	10,000	3 50	....	....	
1848	SPRINGFIELD	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1856	STAMFORD	Ct.	6,250	25	5	April & October.	3,000	3 50	....	....	
1857	STATEN ISLAND	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8,000	10 00		....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00	....	....	
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1853	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1858	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1863	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1863	Virginia City.	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1853	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	....	100	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	....	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wauoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10 000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2½	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25 000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.	*	5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1853	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1853	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	86,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25		Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,500	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	3,000	4 00	....	....	
1854	Yonkers	N. Y.	100,000	50	3½	Do.	10,000	3 50	110	16½	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20.000	25	—	Do.	4.000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	....	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33,040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—		February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	40	7	May.	30,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1853	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	113	Last sale at this figure.
1854	Ottawa	C. W.	40.000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1850	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15 000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	85	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	....	....	
1848	Toronto	C. W.	400,000	50	—		50,000	3 00	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guinea	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	35,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		....	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevideo	S. A.	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
18 4	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	300,000	4 00	....	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25 000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	....	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Ville Clara	Cuba.	50,000	—	—	Do			....	....	
	Auckland	N. Z.		—	—	Do.			....	....	

REPORTS OF GAS-LIGHT COMPANIES.

PHILADELPHIA, PA.

To the Select and Common Councils of the city of Philadelphia:

In conformity with the Ordinances "for the construction and management of the Philadelphia Gas-Works," the Trustees present their twenty-ninth annual report.

It is gratifying to announce to Councils that the trustees have paid off, out of their sinking fund, the three first city loans, contracted for the cost of the construction and extension of the gas-works, amounting to $475,000, and that there is at this time deposited in the sinking fund the sum of $994,461 30 invested in city and gas loans, applicable to the redemption of the gas loans as they shall mature.

The annual additions to the sinking fund, which the trustees are required to invest by the several ordinances providing for the gas loans now outstanding, will enable the board to extinguish them all at maturity, without calling upon the city treasury to contribute its aid, and to hand over the valuable works to the city free of debt. The same satisfactory promise can be made as to the works of the districts purchased by the city.

The contingent fund of the trust amounted on the 1st of January, 1864, to the sum of $837,840 30, which has been applied to the cost of extension of the works, and to that extent has avoided the necessity of loans, which otherwise would have been necessary.

The great increase in the number of buildings, and the opening and improvement of new streets and avenues, have caused an active demand upon the board to extend the gas-mains, to enable the citizens of these localities to introduce gas for public and private consumption; but the want of means have compelled the trustees, and will continue to compel them, to withhold compliance with these demands until councils shall provide the necessary loan for this purpose.

The board respectfully refer Councils to the following remarks in the report of the chief-engineer upon this subject:

"As there has been no extension of the buildings for the manufacture of gas, and an addition of only one-fifth to the gas store-room since the year 1860, when the maximum consumption was but 2,828,000 cubic feet in twenty-four hours; and as the demand for gas has been growing until it has exceeded a maximum of 3,500,000 feet, making an increase of twenty-five per cent.; a point has been reached beyond which it would not be prudent to advance in contracting to supply new customers, without an enlargement of the buildings and apparatus for manufacturing and storing gas. The supply of the present consumption is maintained at considerable risk of occasional failure, which has so far been averted only by vigilant care in keeping the efficiency of the factories fully up to that which they had when new. Should any accidental injury or defect occur, in either of the large divisions of the works a deficiency in the general supply must necessarily ensue, either in quantity or quality."

The quantity of gas manufactured during the year has been 735,698,000 cubic feet; the increase over the previous year is 78,741,000 feet.

This increase is largely owing to the increased activity in manufacturing of all kinds, and to the change in the public lamps from fluid to gas.

The whole quantity made under the trust from its commencement is 6,905,251,000 cubic feet.

The largest consumption in twenty-four hours to this time is 3,548,000 cubic feet.

The street mains laid during the year have a length of 129,873 feet, making the entire length of main-pipes 451¼ miles. The whole number of public lamps under the care of the trust on the 1st inst. was 7,207, of which 7,198 are lighted with gas, and 18 with fluid, whilst 173 have been changed from fluid to gas during the year, to the manifest convenience and security of the public. The entire number of lights supplied with gas from the City Works is 557,979, being an increase of 28,979 during the year.

On the 1st day of July, 1862, the trustees reduced the price of gas to private consumers, in such sums as in effect to neutralize the United States Tax upon Consumption. The wisdom of such a course was gravely doubted at the time, by many persons conversant with the manufacture of gas in Philadelphia, and the result of that year's business was believed to be a full vindication of the policy pursued.

But the great increase in the price of coal, and all the materials used in the works during the past year, and the increase in the price of wages which the board were induced to allow from a sense of mere justice to their employees, rendered it an act of absolute necessity to affix such a price to gas as should enable them to carry on the works irrespective of profit; and accordingly the board passed a resolution on the 13th day of November, 1863, last, directing the price to be increased to $2 50 per thousand cubic feet, with an allowance of five per cent. for prompt payment. The price is thus substantially $2 37½ per thousand cubic feet of gas.

The board, before adopting a measure of such importance and interest, investigated the subject with great care, and were reluctantly compelled to adopt it, after full and mature deliberation. It is believed, however, that the price of gas at present, in proportion to the cost of materials and labor, is as low, and the production is certainly of quality, as excellent as in any city in the United States.

The board submits to councils the report of the "committee of the board" on the subject of the increase of price (a copy whereof is annexed hereto), and trust that the reasons for the measure therein contained will be considered sound and satisfactory.

A full detail of the business of the past year, and of the administration of the executive and financial departments of the trust, will be found in the reports of the chief-engineer, John C. Cresson, and the cashier, William Fennell.

The board desire to express their acknowledgments to all the executive officers of the trust for the able and faithful manner in which they have discharged the several duties of their respective departments.

By direction of the Board of Trustees,

WILLIAM L. HIRST, President.

Attest: JOHN P. MURTA, Registrar.

REPORT OF THE COMMITTEE.

To the Board of Trustees of the Philadelphia Gas-Works:

The committee to whom was referred the report of the cashier, submitted to the board on September 11th, on the financial position of the trust and to whom also was referred the propriety of advancing the price of gas, report: That they have given the subjects very careful consideration, and whilst it would have been more in accordance with their feelings to have continued the price of an article so universal and necessary in its use as gas at the present, or an advance to the old established price, their judgment is that an advance to two dollars and fifty cents for one thousand feet, subject to a discount of five per cent. for prompt payment, is as low as a due regard for the interest of the trust committed to our charge will allow, and they deem it due to the board to state the facts upon which that judgment is based.

Firstly.—In consequence of the great advance on all the necessaries of life, it was incumbent upon the board to raise the pay of those persons in their employ who were in the receipt of small salaries for their support, and the great demand for labor compelled us to raise the wages of both skilled workmen and ordinary laborers to the same pay they could obtain elsewhere. The additional sum required for these two items will be about one hundred thousand dollars.

Secondly.—The price of gas coal for the next year will in all probability rule two dollars above the rate of the present year, and, consuming about 80,000 tons, will make one hundred and sixty thousand dollars.

And in the last place.—The largely augmented price demanded for almost every article required in carrying on our business will amount to not less than twenty thousand dollars, making a total of two hundred and eighty thousand dollars, to offset which we shall receive an advance in our sales of coke, tar, lime, &c., about sixty thousand dollars, leaving a deficiency of two hundred and twenty thousand dollars, which must be realized from the sales of gas; and as we shall probably sell to private consumers the next year 400,000,000 (million) feet, an advance of thirty-seven and a half cents per thousand feet will yield us one hundred and fifty thousand dollars, and an advance of nine dollars per lamp in the public lights will yield us about sixty-three thousand dollars, which together will nearly reach the deficiency.

Your committee had an interview with the gas committee of Councils, and they adopted unanimously a resolution, recommending to Councils an advance to the sum named forty-five dollars per lamp, which we estimate as about the cost to the trust. Should Councils, however, fail to respond to the resolution of their committee, we shall be compelled still further to advance the rate to private consumers, as we feel well assured that no sum less than we have named will enable the trust to meet promptly the payments which by law it is required to make.

Your committee offer the following resolutions:

Resolved, That on and after the first day of January next, the price of gas to private consumers shall be two dollars and fifty cents per thousand feet, subject to a discount of five per cent. for prompt payment, and the United States Tax to be added.

Resolved, That the engineer give notice of the above in the public papers.

EDWARD H. TROTTER,
JOHN MCCARTHY,
A. MISKEY.

Philada., Nov. 9, 1863.

ENGINEER'S REPORT.

To the Trustees of the Philadelphia Gas-Works:

The Engineer-in-Chief respectfully presents his Twenty-eighth Annual Report.

During the year 1863 the factories belonging to the trust have produced 735,698,000 cubic feet of gas, of which

306,864,000	feet	were made at	First Ward.
291,334,000	"	"	Ninth Ward.
125,657,000	"	"	Fifteenth Ward.
11,843,000	"	"	Twenty-first Ward Works.

From the commencement of the works, the quantity made has been nearly seven thousand millions, or, in exact figures, 6,905,251,000 cubic feet.

The greatest daily consumption in the year was 3,548,000 cubic feet.

The following statement shows the quantity of materials used in the production of the year:

	Tons.
Coal in store, Jan'y 1st, 1863	7,604
Coal bought in 1863	91,909
	99,513
Coal used in 1863	75,563
Coal in store, Jan'y 1st, 1864	23,950
	99,513
	Bushels.
Coke on hand Jan'y 1st, 1863	46,686
Coke made in 1863	2,653,104
	2,699,790
Coke used in offices, yards, and streets	27,763
" under retorts	1,467,317
" for exhausters, pumps, and lime-kilns	117,432
" sold in 1863	1 048,054
" on hand, Jan'y 1st, 1864	39,224
	2,699.790

The other materials used in making gas are 2,917 cords of wood, 57 tons of soapmaker's residuum, and 185,197 bushels of lime in purifiers.

The number of meters and service-pipes introduced during the year has been 1,977.

Adding these to the number of meters and services before in use makes the present number in use 46,067 meters, and 46,182 service-pipes.

The applications for gas registered during the year have been 9,581.

Deducting removals and discontinuances, amounting to 7,482, shows an increase of 2,099, which, added to former consumers, makes a total of 46,528 consumers now on the books of the Trust.

The lights added during the year are:

In old City	6,720
" Spring Garden and Penn	10,967
" Southwark	1,797
" Moyamensing	2,890
" Richmond	1,488
" Kensington	1,629
" Twenty-first Ward	577
" Twenty-second Ward	861

In Twenty-third Ward	605
" Twenty-fourth Ward	1,500
	28,979
Previously in use	529,000
Total	557,979

The number of street gas-lamps in the wards supplied by the City Works is 6,770.

Of street mains there has been laid 129,873 feet, making the aggregate length of main-pipes belonging to the Trust 2,383,452 feet, or nearly 451½ miles.

No new work has been commenced in the manufacturing department, expenses for construction having been restricted to the completion of the arrangements made necessary by the change in the manner of bringing the supply of coals to the First Ward Station; it now coming by rail directly into the premises, instead of undergoing transhipment from the Ninth Ward, as heretofore. The range of trestle-work roads and coal-shutes have been completed and put in use with very great advantages in the convenience and certainty of supply in the winter season. To obtain the full benefit of these arrangements the hoisting tower and machinery for raising these rail-borne coals to the storage tracks must be completed, but the utmost endeavors made to keep the requisite force of mechanics on the work have availed only so far as to get the structure to about two-thirds its proper elevation, when the approach of freezing weather made it necessary to suspend the work, in order to its being properly covered to protect it from injury.

As there has been no extension of the buildings for the manufacture of gas, and an addition of only one-fifth to the gas store-room, since the year 1860, when the maximum consumption was but 2,828,000 cubic feet in 24 hours, and as the demand for gas has been growing until it has exceeded a maximum of 3,500,000 feet, making an increase of 25 per cent., a point has been reached beyond which it will not be prudent to advance in contracting to supply new customers without an enlargement of the buildings and apparatus for manufacturing and storing gas. The supply of the present consumption is maintained at considerable risk of occasional failure, which has so far been averted only by vigilant care in keeping the efficiency of the factories fully up to that which they had when new. Should any accidental injury or defect occur in either of the large divisions of the works a deficiency in the general supply must necessarily ensue, either in quantity or quality.

Some inconvenience has arisen in particular localities, in consequence of the consumption having increased beyond the capacity of the local distributing holders and their connecting mains; a difficulty that must not only increase in these localities, but extend to others, unless the needful additions are made to the means of storing and distribution.

For carrying into effect these extensions the Trust has not the control of funds that can be legally applied, and therefore a serious question is presented as to the propriety of continuing to contract to supply new customers unless the trustees are authorized by ordinance of councils to obtain the requisite addition to their disposable funds.

The objects for which the first expenditures will be required include a retort house, with its apparatus and connections, a series of large purifiers and condensers, a large station meter, the telescopic sections of the Diamond and Mifflin street gas-holders, and the completion of their street connections as originally designed.

It is hardly possible to make a reliable estimate of the probable cost of these improvements. The elements of their cost are in a state of continuous change toward higher figures. At the prices heretofore paid for such work their aggregate cost, built in a substantial manner, together with the smaller mains and service-pipes and meters required to meet the special wants of new customers, would be about five hundred and seventy-five thousand dollars. At last year's prices nearly one-half would be added, making the amount of about eight hundred and fifty thousand dollars, and at prices that may prevail next season no certain estimate is possible. It would probably not be entirely safe for the Trust to make engagements for the whole work, unless it should be empowered to raise funds to the amount of a million of dollars during the next two or three years. In this interval the increased demand for gas, if maintained at its present rate, will give full employment to the enlarged works and pipes.

By closing the application books at all the offices of the Trust, so as to suspend the further increase of consumption, the necessity for most of these enlargements may be delayed for a time, but some of them ought to be provided before next winter, to avoid the hazard of failure to supply the increase of customers now coming on the books of the Trust, and that will continue to come until the books are closed by the action of the board.

The most important of these are the purifiers, a large station meter, a portion of the connecting street mains, and additional exhausters. If no other provision is made defraying their cost, it will have to be taken from the balance of the contingent fund, now used as working capital, although that fund is already so far exhausted as to leave an amount entirely insufficient to carry on the business of the works, without the help of credit upon most of its larger expenditures.

It affords the engineer much pleasure to report that the various officers have performed the duties assigned them with the intelligence and fidelity that has been heretofore reported concerning them.

The tabular statements hereto appended present a full exposition of the statistics of the works for the year, and for the whole term of their operations, now embracing nearly twenty eight years.

Very respectfully,

JNO. C. CRESSON,
Chief Engineer.

REPORT OF THE CASHIER.

To the Trustees of the Philadelphia Gas-Works:

Gentlemen,—The cashier's accounts show a diminution of profits for the year 1863, owing to the increased price of coal, advance in wages of workmen, and pay of volunteers sent by the trustees to serve in defence of the State when considered in danger from the inroads of the enemy. These causes have made it incumbent upon the board to raise the price of gas to meet the necessity.

The accounts here follow:

The gross profits of the year amount to		$185,076 70
The appropriations for the year are as follows:		
For interest on gas loans, including those payable at the city treasury		142 450 00
For the sinking funds of all the gas loans		64,550 00
For eight per cent. on $450,000, the valuation of the Spring Garden, Moyamensing, West Philadelphia, and Frankford Gas-Works		36,000 00
For interest on the stock of the Southwark, Germantown, Manayunk, and Richmond Gas-Works, and appropriations to their several sinking funds		24,209 56
		$267,209 56
For loss on the business of the year		82 132 86
		$185,076 70

CASH ACCOUNT.

Dr.

Balance on hand January 1, 1863		$162,157 90
RECEIPTS IN 1863.		
For sales of gas, coke, tar, lime, rents, and U. S. tax, &c		1,470,180 40
For main and service-pipe		14,830 50
For interest on city warrants		450 42
For premium on loans sold		1,148 00
For bills payable		190,000 00
For account of the sinking fund:		
For interest on gas loans	$32,964 00	
For interest on city loans	20 696 50	
For city loans redeemed	84,700 00	
For loans belonging to the sinking fund sold to pay off loans maturing	45,000 00	
		183,360 50
For interest on the sinking funds of the following gas-works:		
Germantown	483 00	
Southwark and Moyamensing	562 20	
Manayunk	321 00	
Richmond	78 00	
		1,899 20
		$1,978,526 92

Cr.

PAYMENTS IN 1863.	
For the construction and enlargement of the works	$61,228 61
For the extension of the street mains	87,190 25
For service-pipes, meters &c	55,202 89
For coal and other materials used in the manufacture of gas, wages of workmen, and charge of the public lamps	826,909 57
For repairs of the works, street mains, &c	119,382 86
For incidental expenses, salaries, &c	222,251 45
For account of the city for fortifications, and settled for by city warrant	3,454 47
For interest on loans	47,392 20
For investments for the sinking fund	5,969 75
For amount paid city treasurer for interest on loans 9, 10, and 11, and appropriation to the sinking funds of loans 10 and 11	110,000 00
For interest on and appropriation to the sinking funds for the redemption of $450,000 of city debt	36,000 00
For interest on gas stocks	17,862 60
For investments of the sinking funds of the Southwark, Germantown, and Manayunk Gas Companies	4,777 38
For loan 2d redeemed	140,300 00
For U. S. Tax on gas sold	102,816 60
For bills payable	50,000 00
For interest on bills payable	3,629 99
	1,894,368 62
Balance	79.158 30
	$1,973,526 92

STATE OF THE WORKS, JANUARY 1, 1864.

Assets.

Works	$1,463,956 03
Street mains	1,089,358 51
Service-pipes and meters	617,878 54
Public lamps	2,174 27
Cash	79,158 30
Suspended debt	24,633 14
Stocks belonging to the sinking fund	994,461 30
Coke on hand	4,680 00
Coal on hand	173,637 50
Wood on hand	4,550 00
Materials for repairs	26,000 00
Due for gas sold, delivered, and on hand	231,388 46
Due for coke, tar, &c	12,500 00
Interest on city loans, due January 1, 1864	9,497 00
Wharf lot on the Schuylkill	6,000 00
Site of the new gas-works	36,957 69
Spring Garden "	300,000 00
Moyamensing "	80,000 00
West Philadelphia "	50,000 00
Frankford "	20,000 00
Southwark and Moy'a Gas-Works	118,240 00
Manayunk "	81,000 00
Richmond "	16,500 00
Kensington "	90,717 79
City Warrants	50,176 74
City Treasurer	107,442 00
Germantown Gas-Works	90,000 00
	$5,775,902 29

LIABILITIES.

Loans 4 to 11	$2,395,000 00
Dividends unpaid	405 00
Interest on gas-loans	11,390 05
Interest on gas-stocks	9,959 85
For coals, repairs and materials, &c	407,484 09
Sinking fund	1,085,918 87
Sinking fund for redemption of $450,000 of city debt	107,442 00
Sinking fund of Southwark and Moyamensing Gas-Works	562 09
Sinking fund of Germantown Gas-Works	1,546 75
" Manayunk "	759 25
" Richmond "	527 46
Stockholders of Southwark and Moyamensing Gas-Works	113,240 00
Stockholders of Germantown Gas-Works	90,000 00
Stockholders of Manayunk Gas-Works	81,000 00
" Richmond "	16,500 00
State of Pennsylvania, for State tax on gas-stocks	1,804 44
City of Philadelphia, for works taken, as per Ordinance of March 20, 1835	450,000 00
Bills payable	140,000 00
Profit and loss for amount of suspended debt	24,633 14
Contingent fund	837,840 30
	$5,775,902 29

[The statements of the Sinking Fund are omitted.]

OFFICERS OF THE PHILADELPHIA GAS COMPANY FOR 1864.

President.

ANTHONY MISKEY.

Trustees.

WILLIAM L. HIRST,	JOHN MCCARTHY,
JOHN MANUEL,	WM. BURNELL, M. D.
CHARLES L. WOLFF,	CONRAD S. GROVE,
ANTHONY MISKEY,	CH'S THOMPSON JONES,
RICHARD LUDLOW,	CHARLES E. GRAEFF,
EDWARD H. TROTTER,	JOHN A. HOUSEMAN,

Engineer.

JOHN C. CRESSON,
Appointed Aug. 26th, 1836.

Cashier.

WILLIAM FENNELL,
Appointed April 10th, 1857.

Registrar.

JOHN P. MURTA,
Appointed April 10th, 1857.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

LIGHT, HEAT, WATER-SUPPLY AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

THERE ARE 20,000 CITIES AND TOWNS IN THE UNITED STATES, CAPABLE OF SUPPORTING GAS-WORKS, WHILE THERE ARE NOT 400 GAS-WORKS IN OPERATION IN THE WHOLE COUNTRY!!!

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C. ELTON BUCK,

ROOMS of the AMERICAN GAS-LIGHT JOURNAL,
No. 39 Nassau st., cor. of Liberty st., opposite the Post-Office.
New York City.

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FOREIGN.

Germany.....B. WESTERMAN & Co., of New York.
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THE
AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

TUESDAY, MARCH 1, 1864.

The *Evening Post*, which is usually a well-informed paper, in a late issue prints the following remarks on the inspection of gas-meters, which show its total ignorance, not only of the instruments referred to, but of the existence of a law which has been in force in this State for several years.

"GAS-METERS.—A Canadian journal reports that the Legislature of New Brunswick recently passed a law providing for the inspection of gas-meters, to guard the public against robbery by false measures. The result was, that in the city of St. John last year, of one thousand three hundred and thirty-seven meters inspected, only five hundred were found correct, and, curiously enough, the eight hundred and thirty-seven incorrect all registered against the consumer.

"Some one of the New York or Brooklyn members ought to bring before the Legislature of this State a bill for the inspection of gas-meters. A correspondent sends us from Boston such a bill, which has been for several years before the Massachusetts Legislature, and would have been before this a law, he asserts, if the gas companies had not opposed it. This bill, a copy of which we shall be pleased to send to any member of the Legislature who will frame and introduce a similar one at Albany, provides for the appointment, by the mayor and aldermen of every city, of inspectors of gas, whose duty it becomes to test thoroughly, with proper machines, the illuminating power of the gas, and also to inspect gas-meters, and affix their marks to those which they have proved correct.

"Such inspectors ought to be appointed in New York and Brooklyn, if only to satisfy the consumers of gas that the enormous rates they pay are for gas actually burned, and of respectable quality. At present, the gas companies have the public entirely at their mercy. Absolutely nothing is known by a gas consumer, of any thing concerning his light, except that it costs him an uncomforable sum, and that gas company stock sells—when any is for sale, which is not often—for something like two hundred and fifty per cent., while there is a rumor that in one of the city companies of late, private dividends have been declared, besides those frequent dividends known to the interested part of the public."

For the information of the *Post*, and other journals who are continually harping on this string, we will state that a law for the inspection of gas-meters is in force in this State, having been passed, we believe, April 14th, 1859. The operations of this act, under the administration of GEORGE H. KITCHEN, Esq., who so acceptably performs the duties of Inspector, have been in the highest degree successful, and all meters now manufactured, before being sold, are obliged to be stamped by the Inspector as evidence of having passed his examination. The meter-proving apparatus, by which these instruments are tested, was thoroughly examined by a commission composed of several of our eminent scientific men, among whom was Professor JOHN TORREY, of the United States Assay Office, and who certified to the correctness of the same.

On February 7th, 1861, in answer to a resolution of the Assembly of this State, in relation to gas-meters, Mr. KITCHEN made a special report of the operations of his department. Between the passage of the act for the inspection of meters and that time, no less than 29,227 gas-meters had been examined by the Inspector, and stamped with his seal. In the answer to the resolution, Mr. KITCHEN remarked, "In nearly every instance have meters been found correct, or registering slightly in favor of consumers." Here is an official refutation of the silly charges so often made against gas companies for over-charges, incorrectness of meters, &c. If consumers would only employ a little common sense in their assertions, and seek to understand the mechanism of meters, they would learn that the chances of error are almost always against the gas companies and in favor of themselves. By the evaporation of water in wet meters, and the lowering of its level, a larger quantity of gas passes than if the water line could be always maintained with perfect uniformity. So with dry meters, the valve-seats are often covered by depositions of naphthaline and tarry matters, which raise the valves from their seats, and thus permit a portion of gas to pass unregistered.

In the report of Mr. KITCHEN, made for the year ending December 1st, 1863, it is stated that 55,504 meters have been inspected since the law went into effect. Thus it will be seen that this number of consumers have received protection, and that the public are not so "entirely at the mercy" of gas companies, as the *Post* concludes. To follow the idea of having a separate meter inspector for New York, Brooklyn, and each other city of the State, would entail a very heavy expense on somebody, and whether the cost of maintaining so many officials be saddled upon the State, the gas companies, or consumers themselves, there would be grounds for many complaints.

As far as the statement of the "Canadian journal" is concerned, we doubt its veracity entirely. The meters may have been tested and condemned by some self constituted inspector, but the assertion that they were so far incorrect as stated smacks strongly of the ridiculous. We do not know what manufacturers of meters supply the city of St. John, but it is hardly probable that any house in the trade could make instruments so unreliable. The story is evidently a Munchausenism, and should be inserted in the next edition of the works of the worthy baron whose name is synonymous with what plain-spoken people would call by a much harsher word.

WATER SUPPLY OF NEW YORK CITY.

The Croton Aqueduct Department of this city has now storage room for a supply of water sufficient for the ordinary wants of the city for weeks at a time. Something, however, is wrong in the distributing mains, for in the lower sections of the city it is almost impossible to draw water through the middle of the day, and even in basements it runs sluggishly. This is altogether wrong and needs immediate attention. The evil has been long felt, and the cause was thought to be a deficiency of capacity in the reservoirs, and it was confidently anticipated that when the new reservoir in the Central Park should be completed, this deficiency would be remedied. "Lake Manhattan" has been full for more than a year, and still the deficiency is felt, so that some other cause is at the bottom of the trouble.

The annoyance caused by this deficiency of water supply is really very serious, as the experience of many consumers will attest. If water is required anywhere above the second floor it has to be pumped, and this is, to say the least of it, troublesome and expensive, and is rather damaging to the reputation for efficiency of the directors of the Croton Aqueduct Department. We no of no other large city where this evil is felt In Philadelphia where the storage capacity is much more limited than here, the head of water is sufficient to cause it to rise with ease to the third and fourth stories of houses and workshops.

We are inclined to believe that the deficiency in the water supply is attributable to the lack of a sufficient number of distributing mains. Whatever it may be, the trouble should be removed at once, for it is anything but creditable to the Croton Board, and we hope they will take the proper steps to see that all portions of the city be fully supplied with an abundance of water.

INSPECTOR OF GAS-METERS.—We learn that the term of office of GEORGE H. KITCHEN, the present Inspector of gas-meters will shortly expire. We trust that Governor SEYMOUR will at once re-appoint Mr. KITCHEN, who, from his long connection with the office, his thorough acquaintance with all its requirements, and his personal qualifications, is better fitted for the post than any other aspirant. Mr. KITCHEN too, commands the entire confidence and respect of the manufacturers of meters, as well as that of the officers of gas companies, and we are satisfied that no better selection can be made. The inspectorship of gas-meters should be kept apart from politics. It is a position which demands qualifications of a peculiar kind, which have nothing to do with political creeds. There are, doubtless, hundreds of office-hunters who would be glad to have the place, but who would be about as well qualified for the duties as a blacksmith is for mending watches. The present incumbent is the right man in the right place, and we hope to see him retained.

GLYCERINE FOR FILLING GAS-METERS.—The recent cold weather which was felt with such severity, particularly in the Western States, gave a practical exemplification of the necessity for a fluid for filling wet gas-meters which will not congeal. We have recently been shown samples of glycerine manufactured by Messrs. Hartman & Laist, of Cincinnati, Ohio, which will stand the most severe cold ever experienced in this climate, and yet preserve perfect mobility and limpidity. The samples brought to our notice were beautifully clear—almost colorless and odorless; and as the efficacy of this substance has been fully proved, gas companies should avail themselves of it, instead of whiskey and other deleterious fluids commonly employed. Glycerine in a pure state is perfectly inert, and exercises no influence upon the metals of which the meter is composed. Whiskey, on the contrary, undergoes the acetous fermentation, by which the alcohol is converted into acetic acid, which exerts a corroding effect on the meter, and soon wears it out. The price of Messrs. Hartman & Laist's glycerine is remarkably low—much below that of the commonest whiskey.

PRIVATE GAS WORKS.—In the Eastern States many of the large print mills are lighted by gas made on their premises. During the past year a large number of these private gas-works have been built.

ANSWERS TO CORRESPONDENTS.

E. C., of N. J.—*You cannot procure a copy in this country. It will have to be ordered through a foreign house.*

P. L. G., of Mass.—*Berthollet was the first to draw attention to the subject. His researches are very interesting and instructive.*

F. B. W., of Ind.—*No. 42 is out of print. The others can be supplied.*

QUERIST, of Mo.—*The theory of the purification of gas is discussed more fully and philosophically in Lewis Thompson's Chemistry of Gas-Lighting than in any other work. It is well worthy of your attention.*

I. H. H., of Pa.—*We cannot tell. Your question is very indefinite. You should be more explicit.*

H. G. B., of N. Y.—*You will find the address of the house in our advertising columns. Their responsibility is unquestioned.*

THE WASHINGTON GAS-LIGHT CO.

PETITION TO CONGRESS.

OFFICE GAS-LIGHT COMPANY,
Washington, December 8, 1863.

To the Honorable the Senate and House of Representatives of the United States:

The enormous price at which coal, iron, and all other materials entering into the manufacture of gas are now held, together with the very great advance in the wages paid for labor, render it impracticable for this company, without a ruinous sacrifice, to continue to supply illuminating gas at existing rates; and I am, therefore, instructed by our Board of Directors to lay before your honorable body the following facts, and respectfully to ask from Congress that reasonable measure of relief which it only has the power to grant, and which we are assured its sense of justice will induce it promptly to extend.

At the commencement of the present war the price of gas was fixed by the Act of Congress of June 25, 1860, which prescribed a uniform rate, both for the Government and citizens of Washington, of 35 cents per 100 cubic feet, subject to a discount of 10 per cent. on all bills paid within five days from presentation, making the net cost to all consumers 31½ cents per 100 cubic feet. This continued to be the rate until the passage of the Act of July 11, 1862, "making further appropriations for sundry civil expenses of the Government for the year ending June 30, 1863, by the third section of which the company are prohibited from charging the Government more than 28 cents, and citizens more than 30 cents, per 100 cubic feet for gas supplied to them, both rates subject to a discount of 10 per cent. on bills paid within five days from presentation." Under this act, which is now in force, the company only receive 25 2-10 cents and 27 cents per 100 cubic feet for gas furnished to the Government and to the private consumers, respectively. When the law making this great reduction was passed, it bore hardly on the company, inasmuch as coal was then 40 per cent. higher than in 1861, and labor also had somewhat advanced; still we acquiesced in the measure in the hope that this state of things would prove exceptional and prices soon return to their former standard. It is needless to say that this expectation has not been realized, but that, on the contrary, labor and materials of every kind have advanced in an unprecedented manner, and the tendency of prices is still upward. Confining myself to some of the prominent objects connected with the manufacture of gas, I beg to subjoin a comparison of existing prices with those prevailing at the commencement of the war (April, 1861), and at the passage of the Act of July 11, 1862, above referred to:

	April, 1861.	July, 1862.	Dec. 1863.
Coal, cost per ton in shed..	$5 00	$6 92	$11 52
Lime, per bushel.....	0 07	0 07	0 09
Iron-work (retorts, &c.,) per lb.....	0 01½	0 01½	0 04
Fire-bricks, &c, per 1,000.	25 00	25 00	40 00
Tiles, average each.....	0 90	1 00	1 30
Fire-clay and cement pr. bbl.	1 00	1 10	1 50
Daily wages of men at works.	1 25	1 25	2 00

From the foregoing it will be seen that coal and iron have advanced over 125 per cent. since the commencement of the war; lime, fire-bricks, &c., from 30 to 60 per cent., and wages 60 per cent.; and it is obvious, therefore, that what might have been a fair price for gas at that period, or in July, 1862, has ceased to be so at the present time.

This view is enforced by the recent action of the City Councils of Philadelphia. The gas-works there are owned by the city, and the gas is supplied to consumers at about cost of manufacture, thereby excluding the idea of profit, which, of course, no one would expect of a private company; yet that city, the very centre of the coal-trade, has been compelled to put up the price of gas nearly 20 per cent., and to require its customers, in addition, to pay the Government Tax of 15 cents per 1,000 feet. If Philadelphia, with the coal at her doors, and an annual consumption (in 1862) of about 656,970,000 of cubic feet of gas, cannot make gas for less than $2 50 per 1,000 cubic feet, ought our company, which draws its supplies of coal from that city at an increased expense for freight alone, at the present time, of $3 per ton, and with a total consumption of gas for 1862 of only 104,356,132 cubic feet, to be expected to sell it at $2 52 per 1,000 feet? I cannot believe that this question will be answered affirmatively, nor that the company will be deemed unreasonable in asking that Congress will repeal so much of the third section of the Act of July 11, 1862, as fixes the present inadequate prices of gas, the effect of which will be to revive the rate existing at the commencement of the war, under the Act of June 25, 1860.

By order of the Board of Directors.

GEORGE W. RIGGS, JR.,
President Washington Gas-Light Co.

CIRCULAR OF THE WASHINGTON GASL-IGHT COMPANY TO THEIR STOCKHOLDERS.

OFFICE WASHINGTON GAS-LIGHT COMPANY,
December 30, 1863.

The undersigned, pursuant to instructions of the Board of Directors, herewith transmits for your information, a copy of a resolution passed by the Board at its meeting this day.

The accompanying memorial to Congress, dated December 8, 1863, will fully explain the reasons for this action. Very respectfully,

J. F. BROWN, *Secretary.*

Whereas, The prices of coal, iron, labor, and all materials entering into the manufacture of gas, and the cost of maintenance and repairs of the works of this company, have *increased* from 60 to over 120 per cent., and Congress has *reduced* the price of gas to consumers more than 17 per cent., thereby rendering it impossible to manufacture and sell gas without loss; and whereas, the operations of the company for the past six months show no profit; therefore,

Resolved, That it is not in the power of the directors to declare a dividend.

GLASS GLOBES FOR FISH-TAIL BURNERS.

The unpleasant flickering which is observed in the flame of all fish-tail burners covered by glass globes is familiar to most gas consumers. The unsteadiness of the light caused by this flickering is extremely painful to the eye, especially when reading or writing for any length of time. Mr. J. O. N. Rutter has communicated an article on this subject to the *Journal of Gas-Lighting*, in which he points out the reason of the unsteadiness of the flame, and makes known an improvement introduced by Thomas Warner, Esq, of Kemp Town, Brighton, England.

Mr. Rutter's theory is correct, viz., that the opening in the under sides of the globes is too small, and does not admit a sufficient quantity of air to ensure a regular combustion of the gas. The opening at the top of the globes is usually much larger than that below, while, in order to insure steadiness of light, a better proportion ought to be observed. Regarding the present mode of constructing these glasses, Mr. Rutter says: "On examining the glasses of several makers, some common, and others eleborately engraved, I have found the diameters of the lower opening to vary only one-sixteenth of an inch, whilst in the upper openings the differences are one and a half inch, ranging between four and five and a half inches in diameter. In the height of the glasses there are also the same kinds of irregularities, the differences being two and a half inches. The dimensions of the improved moons for fish-tail burners are as follows, namely, diameter, seven inches; height, four inches; diameter of lower opening, two and three quarter inches; and of the upper, five and one-eighth inches."

In addition to the irregularity of the size of the openings in glass globes, there are some chandeliers in which the galleries holding the glasses are so large as to nearly close up the lower opening, and thus diminish still more the quantity of air necessary to a perfect combustion.

This subject is one of some importance to the comfort of gas consumers, and is well worthy the attention of manufacturers of gas-fixtures and globes. We are confident that by adopting a correct method of apportion, the sizes of the respective openings of the glasses, a much more steady light could be obtained, and we would hear far less of the injury to eye-sight which some consumers now complain of. At present, the only remedy is to use Argand burners, in which the flame burns as steadily as the flame of a lard lamp.

MUNICIPAL GAS COMPANIES.

The Philadelphia *Inquirer* of a recent date makes a furious onslaught against gas companies in general, and the Philadelphia Gas Company in particular. The incentive to this course was the recent action of the Legislature of New Brunswick passing a law relating to the inspection of gas-meters, which, as will be seen in another column, also excited the ire of the *Evening Post* of this city. The *Inquirer* speaks of meters as "automatic story-tellers," and falls in with the popular belief in the corruptibility of all gas officials. We refer to this matter only to show that the officers of municipal gas companies are subjected to the same constant clamors, and the same silly charges, as are those of private corporations. In fact, it seems to be the lot of all persons connected with the gas manufacture, to be constantly assailed, and to be treated with the most emphatic Billingsgate. Editors, when writing on this subject, often drop the language of gentlemen, and resort to the vernacular of fish-women. We quote from the *Inquirer*, as follows:

We wish that the Legislature of Pennsylvania would be as watchful of the interests of our people as the Blue Nose lawgivers are of the rights of their constituents. If the Councils of our city could by some extraordinary miracle assume an independence of their own creatures, the Trustees and officers of the Gas Works, much good might be done in this matter. Every citizen who has used gas for ten years knows full well that his meter registers against him now a greater consumption of gas than it did in the early part of that period, and yet he knows himself that his business or household affairs are so conducted that he requires and uses no more light now than he did then. The complaints upon this subject are universal, and the explanations at the gas office are evasive and unsatisfactory. Sometimes the difference is attributed to an excessive pressure upon the pipes or defective burners, but usually the short method is taken of a wholesale denial that there is any cause for complaint, and a deliberate insinuation that the consumers are actuated by improper motives.

It is in vain to expect any relief from the City Councils in this matter, or in any other connected with the gas trust. In past years various investigations have been made, after continued remonstrance by citizens, against alleged abuses in the Department; but in every case the result was a report not only against the complainants, but in most cases in vindication or praise of the management. The fact is, that the members of Councils are, in most cases, unfitted to make examinations into subjects which are scientific. When they get into the Gas Works they are, by their ignorance, completely at the mercy of the officers of that Department, and usually they are made mouth-pieces to report the defenses of the parties whose policy is the subject of complaint.

Upon this matter of the incorrectness of gas meters the most obstinate incredulity reigns in the Gas Office. A citizen whose gas bill suddenly jumps up from an insignificant amount to a very heavy sum, without any apparent cause for it in his manner of using the gas, can seldom obtain any other satisfaction at the Gas Office than the stereotyped declaration, "the meter can't lie." And yet he knows that the meter does lie, but has no means of testing its correctness; and, if he is stubborn, he must submit to the deprivation of light until he pays the unjust charge. The Gas Trust has its customers completely on the hip. It supplies the meters to measure the gas for them, its officers decide whether the machines are true or false, and they enforce their decrees by a summary stoppage of light, whenever the citizen who believes that he has been cheated feels disposed to resist. Submission is the only policy which the arbitrary rules of the Gas Office will permit, as resistance practically becomes impossible where the vendor has the power of stopping off future supplies.

GAS IN ENGLAND.—The Commissioners of Sewage of London have resolved to attach meters to all their public lamps. At Nottingham and Wolverhampton the authorities have resolved to adopt the average meter system. This system is growing in favor in England, and the *Sanitary Reporter* says that almost daily it is being adopted by one town after another.

PAPERS ON HYDRAULIC ENGINEERING.

BY SAMUEL MCELROY, C. E.

No. 4.—City Sewerage.

[From the Journal of the Franklin Institute.]

(*Continued from page* 188.)

The general characteristics of sewage disposal, and of ancient and modern practice, having been considered, it remains to deduce from this subject prominent principles of arrangement and construction in reference to general and specific plans, for the main trunk or *arterial* system, and the lateral or *venous* system, and their appurtenances, which will be noticed in this order.

Topography.—In any general plan of city sewerage, which properly includes the disposal of rainfall and the minor supplies, a careful study of the entire local topography is requisite, not only as to the area of the city proper, but as to all the lines and slopes of natural drainage which connect with it.

This forms the proper basis of the plans of main trunks or arteries, as to their location along the flow-lines of the ravines, and prominently as to their sizes and forms, since it is shown that any adequate provision for storm-flow must be largely in excess of the house-sewage discharge.

It also follows that a study of the primary, secondary, and tertiary ravines, and their water-slopes, controls the subdivision of these arteries in length and size, with reference to the special areas drained.

In this sense, the arterial system of any correct plan of sewerage is independent of populated area, or population, and, if properly arranged at the outset, will never give occasion for rearrangement; and the propriety of careful and substantial construction, so far as the system may be carried out at any intervals of time towards its final completion, is clear.

The importance of this principle might be strongly urged; it is a safeguard against all future trouble; the accidents of populative increase, or change of water supply, or improvements in pavement, always find whatever is completed adequate to all demands; and the long schedules of public and private damages which are thus avoided are negative witnesses of its superior economy, as a question of cost.

Outlets.—The places and method of discharge for these arteries vary in convenience and propriety in different localities, and demand careful scrutiny. The question of atmospheric and hydraulic contamination has justly received in cities like Amsterdam Hamburgh, Paris, London, Boston, and many others exposed to tidal reactions or sluggish receptacles, the most earnest attention, and in some cases induced very costly constructions of artificial intercepting outlets.

In the case, however, of tidal streams of considerable size, or any body of water in constant motion, there is room for question, in more than one instance, whether the cost of interception would be justified with a system of sewage disposal properly charged with water supply, since contact with large bodies of cool water and aeration have a powerful protective influence over the objectionable qualities of sewage. There may be an extreme in apprehension as in neglect of proper care, and popular prejudices are often permitted to overrule intelligent and safe counsels, as we have had several occasions to notice, where valuable and economical water supplies were rejected from erroneous doubts of their quality, or assumed impregnation. Both at London and Paris, it is possible that a slight contraction of the Thames and Seine, so as to ensure a positive current, would be safer, in a sanitary view, than the extended intercepting areas of sewage flow, which, in the former case particularly, is almost certain to be returned to the city with each flood tide, and deposited at slack water.

Sewer discharge into sluggish basins or receptacles of any kind which accumulate deposits, is highly objectionable.

The use of pumping power to obtain an artificial outlet, where natural fall is denied, is a very simple, effectual, and often economical process. There is no mechanical difficulty in pumping sewage, and with the high standard of duty in engines of correct design, the annual cost is not formidable, and may be largely overbalanced by resort to other expedients for drainage, under an erroneous impression of cost. If, at Chicago, no advantages in a mercantile way, and in other respects, were realized by the gradual elevation of the streets and buildings, the use of pumps to obtain outfall would have been clearly justified, as a matter not only of economy, but of superior efficiency. At New Orleans, unquestionably, a system of sewers with artificial outfall would redeem the sanitary reputation of that important city.

Advantage is sometimes taken, with success, of intermittent water supply, as at Hamburgh, Jersey City, Savannah, and other places, to flush the main sewers, where natual inclination cannot be had, and in the case of Savannah particularly, the results, with a very slight inclination, prove satisfactory. In the case of arterial systems exposed to tidal reactions, the use of simple outfall gates may operate as flushes, with certainty. But it is evident that intermittent or automatic arrangements of this kind are not comparable with constant, self-acting grades, and should be restricted to cases of special necessity.

Location and Form.—The proper location of the sewage arteries is along the drainage ravines or flow-lines of the principal water-shed slopes of the general area to be provided for; and they should be adapted in form, size and grade, the three elements of discharge, to the ultimate requirements of their special supply areas.

The form of trunk mains is somewhat controlled by the materials used in their construction, circles and ovals being most convenient for brick-work, where a different section is required for stone-work of moderate cost.

For sewers which exceed five feet in diameter, stone-work lined with brick-work, with a compound section, nearly vertical at the sides, combines strength, durability, and facility of flow. For those between five feet and forty-two inches (which is the proper limit to arterial size), brick-work is the most convenient, and the oval form with the minor curve at the base the best; but the selection of sewer and aqueduct bricks should be made with great care, to secure thorough burning, since when exposed to dampness they need very compact section, nearly impervious and indestructible.

For the more common size of trunk sewers, the oval form has the advantage of a constant and concentrated current during the ordinary periods of house discharge, in which the city water supply is carried off; and of an increasing discharge section for storm-flow, as the water area is increased; it also admits examination and repair more fully than a circle of the same area.

By reference to the table given under the head of *Rainfall*, p. 454, vol. lxxvi., the relations between section, inclination, and discharging capacity, will be found as guides for the arrangement of the primary, secondary, and tertiary mains in subjection to their drainage areas, and the gradual concentration of drainage towards the principal artery, from its branches, will control its conditions of arrangement.

Tubular System.—The arterial system which has been presented belongs to the more general and rude division of the work, while the precepts of theory and practice point out the venous or tubular system as the most delicate in its order and the most vital in its effects.

For all cities of any important size the use of trunk mains is desirable and proper, in their legitimate places, and should not be neglected; but the laws of sewage flow also demand, in all the subordinate branches of discharge, the use of laterals, which will properly solve the problem of "adequate disposal in the shortest time," and these should be pipes.

The same principle of arrangement which establishes the conditions of a trunk main by its drainage area should also control the several groups of pipe-feeders which convey to it their several district accumulations, by their own laterals and mains, and which vary from 6 to 24 inches in diameter, and range from 1 to 115 acres in drainage capacity, on inclinations of 1 in 60.

This network of veins not only admits the most careful adjustment and secures the greatest economy in first cost, but also illustrates the principle of concentration of flow, by which the ordinary water supply is enabled to act with full power on all the substances which disposal of sewage includes.

In the arterial system, moderate inclinations are, as a general rule, controlled by natural formation along their lines, and involve a condition of safety, on this account, under the discharge of large bodies of water; but in the venous system greater inclinations are natural and advantageous to the reduction of calibre.

But since it has happened in some cases, where trunk mains have occupied the place of pipes, that their outlets have been surcharged under storm-flow, it is erroneously concluded that their size was inadequate, whereas the fault lay in their great rapidity of lateral supply under objectionable grades, which accumulated on their outlets, suddenly and uselessly, masses of water that might have been properly disposed of by a more correct system. Pipes, therefore, are useful to their trunk-mains during storm-flow, in preventing effects which have been used as arguments against their adoption; and they do this without risk of being themselves surcharged.

In every arrangement of city distributing water-pipes, the lengths of large mains form a limited proportion of the aggregate length of pipes laid. Of 120 miles of pipes specified in the Brooklyn Water-Works contract, 64 miles were 6 inches in diameter. In Boston and many other cities an important proportion of the water-pipes is less than 6 inches in calibre; and the ordinary size of house service-tap is one-half or five-eighths of an inch.

If, then, water supply, as is shown under the head of *House Sewage*, is a correct measure of the ordinary sewage-flow, with what propriety can any engineer construct sewers 48 inches in the clear, in the same streets and for the drainage of the same blocks of buildings supplied with 6-inch water-pipes? It is true that the supply is delivered under pressure, while the discharge must be by much less head, and that storm-flow must be accommodated; but with liberal allowances for these conditions, any study of water supply in most of our cities emphatically condemns the proportions of their sewers.

In the *Analysis of Sewage* it is shown that the proportion of solid matter is rarely as high as 1 in 142, is generally assumed at 1 in 600, and is sometimes less than 1 in 1,000. We see, then, the abundant natural position which exists for the prompt and complete removal of all the noxious constituents of sewage, before they can become injurious.

To accomplish this, however, it is necessary to secure a concentration of flow in the channels of discharge, so that the scouring action of the water may be fully realized by its force and direction, and this end can only be accomplished by a system of pipes in its greatest perfection.

This point is very clearly illustrated by the experiments of Mr. Blackwell, mentioned under the same head, which show the remarkable power of water currents in moving insoluble materials of great specific gravity.

For the discharge of a given body of water a reduction of section involves an inverse increase of velocity; and while this applies directly to the comparative efficiency of large and small branch sewers, it must also be remembered that a direct impinging current has a power greatly superior to the same current striking at an angle, or finding free vent above or on either side of any obstructing deposit. The impact of a thread of water is measured by its angle of incidence, and its departing velocity and maximum effect is obtained when these are a minimum.

The whole theory, then, of the venous or tubular system of sewerage, as subordinate to the arterial system, is based upon its complete concentration of flow, for ordinary discharge, at the time and in the places where perfect action is most desirable, and upon its more perfect adaptation to the contingencies of storm-flow.

In this case, as in every other case, principle vindicates itself in the field of practice, by a mass of corroborative testimony which abounds, in a negative or affirmative form, in every system of sewers, from the remorte Past to the speeding Present.

In those instances where the venous system has been ignored, and disproportionate sewers constructed, the results have amply condemned the practice as to cost, sanitary evils, damages from floods, and annual expense of administration, built for convenience of entrance and cleaning, they have needed constant visit-

ation and most costly excavations. Of 69½ miles of sewers examined in the Surrey and Kent districts of London, the deposit was usually about 2 feet in depth, and in some cases 5 feet, reeking with foul gases, subject to explosion and choke-damp, and in an advanced state of decomposition. In New York the expense for repair and cleaning on 107 miles was $45,921 in 1860, a sum which nearly doubles the entire annual sewerage administration of Brooklyn on about the same length. As spacious reservoirs of deposit and offensive gases, they furnish food and harbor for vermin, while surcharging the atmosphere with hurtful exhalations. As peculiarly subject to overcharge in storm-flow, they have been fruitful sources of public and private danger, while in strength and durability they do not compare with their more compact rivals; in point of cost the balance against them is excessive; and from necessary roughness of line and surface their excess in friction is not less than twenty-five per cent. on the same wet perimeter.

Pipes are therefore to be preferred as impermeable, capable of close and firm joints, smooth in surface and regular in form, of great strength, of maximum capacity for discharge; as self-cleansing, easily transported, handled and laid, moderate in cost, and highly efficient.

Section.—In some cases of tubular systems, the oval section has been carried through all the ranges of calibre in the several groups; but, from 18 inches diameter down to house connections, it is doubtful whether there is any benefit realized to balance disadvantages in manufacture and laying. In Brooklyn the pipes of 24 inches calibre are made with an oval section of about 29 by 19 inches, which is the form lately introduced in New York, Albany, and some other places, but smaller sizes are circular, and can be more carefully made and jointed. Since, with half their section as water area, a 6-inch pipe, on a grade of 1 in 65, has a velocity of 4 feet per second, and an 18-inch pipe on a grade of 1 in 294, 3 feet per second, there can be no special advantage in improving the scouring power of the current by a reduction of the lower part of the section.

The effect of comparative perfection in surface and form for water conduits is much more important than usually supposed. Between brick-work and earthenware unglazed pipes a difference of 25 per cent. has been experimentally shown in favor of the latter, and between the *red pipe* and the *stoneware* pipe experiments given in Appendix 2, page 179, London Report of 1850, show 15 to 31 per cent. difference in favor of the latter.

Perfection of form and surface is thus important, and also perfection in joints. In some of the cases of stoppages found in London and other pipes, defective joints were shown to be the arresting cause, and the difficulty which attends the perfect manufacture of earthenware pipes has had a great deal to do with their slow adoption in some localities.

Inlets.—Pipe discharge is also seriously increased or modified, and efficiency of action promoted or hindered, by the form and action of the lateral inlets. These should invariably be curved or inclined towards the line of discharge. The doctrine of "resolution of forces" is illustrated by some remarkable experiments on inlets, all of which go to show an important increase of flow in the receiving conduit, with proper inlets. In one case given, Appendix 2, page 192, Report of 1850, ten inlets increase the main current 50 per cent. in velocity; in other cases the gain is stated at 300 per cent.

Materials.—The extensive use by the ancients of earthenware pipes, many of which are still in operation, and, as we have seen at Zurich and other localities under excessive pressure, settles the question of their strength and durability. Experiments made in London, Brooklyn, and other modern cities, fully confirm this point.

But a careful discrimination must be made between stoneware pipes as of European manufacture, from fire-clay, and the best specimens of American manufacture, and clay pipes of coarser materials, imperfectly burned, and of irregular form and section.

On the materials of the Brooklyn pipes, Mr. Adams, in his report of March 19, 1859, remarks:

"The pipe imported during the past season for use in this city, from Glasgow, Scotland, and the north of England, are entirely different from the above, being manufactured, to appearance, of a strong fire-clay, resisting a high heat, and admitting of any required thickness and consequent strength. This description of pipe is believed to be less *brittle* and less *liable to fracture* in the handling, and better suited to the purposes of a sewer than pottery-ware. It is required to be of greater thickness, and to be well burnt throughout, and rendered impermeable by the glaze, which *should have become incorporated* with the material of the pipe, and not liable to separation from it. The clay for this description of pipe is found in this country, but there has been too little demand for it hitherto to encourage its manufacture. The Chelsea Pottery Works, New York, have made some trial pipes of this description which show great strength, and suitable for sewer pipes, but have not yet been brought to the requisite degree of *finish in form*—this accuracy of form being regarded of even more importance than a smooth interior."

* * * * * *

"In packing the pipe in the press for the purpose of experimenting, many pipes were broken by the unequal bearing and cross strain induced by the effort to effect a tight joint at the ends, which in burning necessarily had become *more or less warped;* hence, the pipe was badly strained before applying the hydraulic pressure. We have proved them with a head of 150 feet."

The italics in these quotations present some of the defects to which burned pipes are liable, viz., brittleness, defective glazing, and irregular forms. The losses by breakage in handling and transportation are sometimes quite large; in those cases where the burning and glazing are imperfect, the effect of moisture gradually destroys the pipe; while an irregular or excessive heat warps the lines and joints. Earthenware pipes therefore require great care in manufacture and selection, and in this country they still fall short of the European standard of stoneware.

For reasons of this kind, and the objections to importation, preference has been given in Brooklyn and some other cities to pipes manufactured of concrete, made from hydraulic cement mortar and beach gravel, very carefully mixed, and moulded under pressure These pipes have great perfection in form, since the process fully admits perfect moulding, and, in common with other preparations of cement mortar, which has been thoroughly mixed, so as to avoid "drowning" on one hand, and to secure crystallization on the other, their strength is increased by age and insured by moisture. They "set" rapidly, so as to become abundantly hard in six weeks or two months, are easily fitted with branches and nipples, by any mason, in the trench, are easily transported, and are cheaper for sewerage than stoneware or brick-work. A number of miles of this kind have been laid in Brooklyn, and the entire theory of hydraulic construction confirms the principle of their manufacture. Built on polished cast-iron cores, their internal curves are exact duplicates of each other, so that perfect lines of discharge may be laid, with close socket-joints, and with great smoothness of surface. In friction, durability, readiness of manufacture, and cost, they may be considered the best pipe-sewers in use.

Exhalations.—The use of comparatively small pipes which maintain a continuous flow, not only ensures the sanitary benefit of prompt removal for sewage matter, but also controls the air currents of these laterals, so as to carry them in the line of flow. This effect of a running stream in contracted channels, reverses the action of the system superseded, as to exhalations of noxious gases, with benefits of no ordinary value to populated districts.

Appurtenances.—These, in modern practice, consist of man-holes, lamp-holes, and street basins.

In European cities, where the street pavement is much used, access is had to the sewer by entrances from the sidewalk, or some point in its vicinity, so that the work of cleaning and examination does not interfere with carriage travel; these entrances are large inclined culverts. In our cities vertical shafts are built from the sewer centre, generally at street intersections, or at convenient distances for cleaning.

In Brooklyn the man-holes are built of brick, with an elongated working section of 4 by 3 feet at the sewer, and reduced to 2 feet diameter in the shaft, which is capped with a cast-iron cover on a granite frame, or by a better pattern on a cast-iron frame at the pavement grade. At summits and other points intermediate between the man-holes, shafts of brick-work or pipes (the latter 9 inches in diameter being the most simple), are built to pavement grade, to be used as lamp-holes, when examinations are desired from the man-holes.

For the flow of street-water into the sewers, street-basins, or gullies of various forms and devices have been used in different localities. These properly belong at depressed points in gutter grades, and more particularly at street corners. They are of great use in preventing long currents of storm-water from interrupting pedestrians, and damaging pavements and property, and facilitate the construction of street railways and other public improvements; they are also of great sanitary value, in preventing the common evils of gutter decomposition where gutter-flow would not otherwise be properly provided for.

These basins have various forms; their office is to collect the dirt washed from the streets, while passing the storm-flow into the sewers, with which they are connected by culverts or pipes; in Brooklyn pipes are used 9 inches in diameter; they are also, in modern practice, built with a trap wall, to prevent exhalations into the streets; for the wash of cobble stone or Macadamized pavements, the use of a chamber which will contain 4 or more yards of *detritus*, and prevent its passage into the sewer, has some advantages, and is a necessity in all those cases where the sewers they connect with are not self-cleansing, but they must be cleaned at intervals, involving a costly and disagreeable operation; for this reason, where the double advantage of cleanable street-pavement and self-acting sewers can be had, the basins should be built with a low discharge pipe, so as not to act as retaining wells.

An occasional want of care in the foundations of street-basins and man-holes is shown by settling, which breaks joints and tubes; here the use of concrete may be strongly urged, as furnishing the most perfect base at the least cost.

Of the various details of construction for pipe-sewers, as to careful lining and grading; careful bedding and tamping; the use or disuse of cradles, or grillage in soft beds; the advantages of socket-joints; the position and form of inlets; the regulations proper to administration; the relative cost of various parts and kinds of work; the use and objections of tunnels in difficult cutting, and the like, much might be said of a practical nature, which we pass over, as questions rather of special application, in a discussion of general principles.

Back Drainage.—The usual system of house drainage is by separate drains leading from the back of the lot or house through the cellar or foundation to the street sewer. This is known as the system of *front drainage*, in distinction from a system introduced in London, to a considerable extent, by which advantage is taken of the usual arrangement of city blocks to make the drainage entirely through the rear lots, with outlets in the side street-sewers. On this point the Report of 1850, Appendix 2, page 116, thus remarks:

"The bulk of the drainage and the most deleterious portion is generated chiefly at the backs of the houses, and would, under the old system, be sent from thence through the house to the sewer in front, having to travel through the greatest possible space, with the least possible velocity, and with the widest diffusion of the flow. In the formation of the system the disturbance of the flooring, joists, and walls of the houses, of the roadways and public streets, peculiar to this system, or of far greater amount than in the back system, to the annoyance of the inhabitants and interruption of public transit, is certainly a consideration of much weight."

On page 140 this theory is illustrated by reference to examples in practice, from which it appears, among others, that in one block of 23 houses the lengths of front and back drains were as 1,437 to 783, and the cost £131 13s. 6d. to £45 12s. 6d.; in another case of 46 houses, the lengths were as 1,892 to 1,143 feet, and the cost as £178 19s. 8d. to £66 5s. 2d.

Evidently, many cases occur in the arrangement of city sewerage where this theory may be applied with

great success, both as to economy in cost and as to improved action.

Conclusion.—We have attempted to group here the leading principles of correct sewerage, as illustrated by past and present experience, and put on record for the benefit of constructors. It is a subject, as will readily be observed, of too wide a range and too important a character to be comprised in sketches of this kind, made with the outlining *porte crayon* and *currente calamo;* but if they serve to direct more careful study to their theories and to promote the advancement of educated practice, or to correct any existing evils, their purpose will have been accomplished. It may be said additionally, that it is scarcely necessary for the collaborateur to disclaim originality.

Wooden Gas-pipe.—Some gas companies, it is said, are using wooden gas-pipe, well coated with coal-tar. This is in consequence of the high price of iron pipe. We are inclined to think that the leakage accounts of these companies must be large.

Woodstock, Vt.—At this place the Aubin Gas-Works Company's process and apparatus are used, and it is said with very satisfactory results. The yield of gas is very large, and its illuminating power high.

New Rochelle, N. Y.—Mark Levy's wood-gas process is still highly successful at this place. An opposition company has been started in the town, which is a very small place, and we are informed that but two consumers take their gas. The others prefer the brilliant light made by Levy's process.

Water Supply of Aberdeen, Scotland.—An additional supply of water for Aberdeen, from the river Dee, twenty miles distant, has been proposed by Mr. Simpson, C. E. The amount of water derived from this source will be 5,000,000 gallons per day. The cost of the extension will be about $500,000.

Gas from Cotton Seed.—In several of the Southern cities which have lately been captured by the United States forces, cotton seed is the only material for making gas. The pressed cake has long been used for gas-making with excellent results.

The Coal Famine.—In some parts of the Western States coal is lamentably scarce, and prices continue high. This state of affairs will cause the development of many new mines, and will lead capitalists to remedy the deficiency of transportation which is so sensibly experienced.

The New Jersey Railroad Monopoly.—With scarcely a single exception, the newspaper press is agitating the question of Congress establishing roads for military and other purposes from New York to Philadelphia, and thus taking the monopoly from the companies which have grown rich and independent from their exclusive privileges. We hope the carrying privilege will be thrown open to all competing lines. Then the public may expect some accommodation.

Danger of Inhaling Laughing-Gas.—Two deaths have been recently reported, occasioned by the inhalation of nitrous oxide gas. The last one reported, was in a town in this State, where a travelling dentist gave an exhibition, in which he administered the gas to a young girl who was before in perfect health, but who died almost immediately from the effects of the gas. All anæsthetics are dangerous in the hands of inexperienced persons, and their use should be avoided as far as possible.

Philadelphia, Pa.—We give a large portion of our space in this number of the Journal to the report of the Philadelphia Gas-Light Company. It will be seen that the increase in the amount of gas manufactured last year was very large, and this increase is proportionally felt by nearly all the gas companies in our northern cities—particularly those where manufacturing is carried on to any extent. The increase of price seems to have had no effect in retarding the consumption of gas.

Rather Fishy.—A correspondent of an English paper, writing from Fenton, states that early in December, during a thunder-storm, the lamp-lighter was going his rounds, and had opened the lantern door and turned on the gas-cock, when a sudden flash of lightning ignited the gas, and saved him the trouble of lighting a match. The letter does not vouch for the veracity of the lamp-lighter who told the story.

Naphthalizing Machines.—It is strange that so many of these humbugs should be patented. Our foreign files contain many notices of new "inventions" whereby atmospheric air is naphthalized, and the people are deluded into the belief that by their use they are employing a safe and economical light. These machines are dangerous, and repeated instances have occurred where explosions have resulted in death.

PATENTS.

UNITED STATES.

41,340.—Barnard Hackett, assignor to Wm. G. Harden, Pittsburgh, Pa., for Barrel for Carbon Oils:

I claim constructing barrels for holding carbon oil and other penetrating fluids, with a metallic body encased in wood, and head or end pieces composed of two or more layers of wood glued together, or having a metallic lining between the layers of wood, constructed substantially as hereinbefore described.

Also making the heads or end-pieces of barrels of two or more layers of wood, set so that the grain of the wood in any one layer shall cross the grain in the other, united with glue or other cement, substantially as hereinbefore described.

Also, making a corrugation or indentation around the metallic body of the barrel near each end, for the purpose of holding the heads in place, and making a close joint, substantially as hereinbefore described.

Also, placing a metallic disc between two layers of wood forming a barrel-head, and uniting them together with screws or rivets, substantially as and for the purpose hereinbefore described.

41,351.—Benjamin Rhodes, Bow, Great Britain, assignor to James McGeary, Salem, Mass., for Making and Coating Pipes, Joints, Bottles, Casks, and other Vessels:

I claim, first, The mode or method herein described of molding and forming elbows, bends, and other hollow vessels, articles and things, by the combination of elastic fabrics with bitumen, bituminous compounds or mastic, as herein set forth.

Second, The mode or method of forming hollow vessels and other articles by means of elastic fabrics in combination with strips of paper, canvas, or other materials, and bitumen, bituminous compounds or mastic, for the purpose of combining the layers together, and rendering them impervious to water.

Third, The cement used for coating tubes for conveying gas, and for other purposes, made substantially of the materials and in the manner set forth.

Fourth, The machinery or apparatus herein described, for making long pipes or tubes.

Fifth, The use of sulphur or brimstone in combination with any of the materials before named, for the purpose set forth.

Sixth, The mode or method of constructing mandrels or cores for making tubes or pipes, as herein set forth, and as illustrated by figures 22, 23 and 24.

Seventh, The application of wire netting, substantially as shown in figure 26, for the purpose of giving additional strength to the connections or joints of pipes and vessels.

41,431.—William Elmer, New York City (antedated in France, Aug. 29, 1863), for Manufacturing Illuminating Gas:

I claim, first, The process of transmuting into illuminating gas the liquid products obtained in the gas manufacture by decomposing them by heat in the presence of the light carbides of hydrogen or hydrogen given off by the gas stock during the latter part of its distillation, the said process being conducted substantially as above set forth.

Second, The process of transmuting liquid hydrocarbons into acetylene by decomposing them at a high temperature in the presence of heated hydrogen produced by the decomposition of water, the process being conducted substantially as above set forth.

Third, The process of transmuting deposited carbon into acetylene, by subjecting it to a high temperature in the presence of heated hydrogen, produced by the decomposition of water, the process being conducted substantially as above set forth.

41,432.—William Hodgins, Albany, N. Y., for a Catoptric Lighting Apparatus:

I claim the perforated ornamental frame, A, secured to the opening or chamber, B, and provided with the hemispherical glass shade or basin, C, and reflectors, H, enclosing the burner, E, and forming a combined lighting and ventilating apparatus, substantially as set forth.

Second, I claim the independent smoke-pipe, I, provided with the outer casing, J, and opening, K K, when used in combination with the opening or chamber, B, and valves or covers, M N, substantially and for the purpose specified.

41,434.—J. S. Hull, Cincinnati, Ohio, for a Burner for Vapor Lamps:

I claim the perforated plate, C, forming the bottom of a chamber, B, which first receives the mingled gases and air, and transmitting the same to another chamber, D, below, substantially as and for the purposes herein specified.

I also claim the apron or screen, f, arranged and operating substantially as and for the purposes herein set forth.

I also claim the flange-plate, G, constructed and operating substantially in the manner and for the purposes specified.

41,473.—E. S. Blake, Pittsburgh, Pa., for a Lamp Chimney:

I claim, in a lamp-chimney composed in part of plates of flat glass, the erection of any two or more of said plates in the same plane, to form a part of the shaft of the chimney, as and for the purpose set forth.

41,496.—W. T. Eddy, West Hoboken, N. J., for a Petroleum Stove:

I claim, as a new article of manufacture, the petroleum stove constructed as above described, with a bottom-plate, B (adapted to receive one or more lamp-burners), a top-plate, C, window, c, chimney, D, and deflector, G.

41,543.—Nathan Stedman, Aurora, Ind., for a Pump-Valve:

I claim the arrangement of the hollow piston, E, having the side perforation, G, and double-acting disc-valve, I i, seating alternately on apertures, F and F', at the top and bottom of the piston, and confined to a motion in the line of its axis by a stationary rod, J.

41,547.—James Stratton, Brooklyn, N. Y., for a Reflector for Gas-Lights, Lamps, &c.:

I claim as an improved article of manufacture a reflector for gas-lights, lamps, &c., having a body of cast or wrought meta with an enameled inner or reflecting surface, substantially as herein set forth.

41,508.—Birdsill Holly, Lockport, N. Y., for a Water-Wheel:

I claim the reservoir, c, bearing, d f, and conduit, g, in connection with the induction, B, beneath, substantially as and for the purpose herein set forth.

41,567.—Roswell R. Brooks, assignor to himself and G. H. Horton, Weedsport, N. Y., for a Water-Wheel:

I claim the combination of the gate, E, with the extremity of the partition plate, C, in the manner herein shown and described, so that when said gate is open it will form a continuation of the plate, C, and will at other times simultaneously regulate the flow of the water through both of the compartments, c c', all as set forth.

41,599.—F. W. Brocksieper, Bridgeport, Conn., for a Gas Regulator:

I claim the arrangement and application of the slotted adjusting screw, A, or its equivalent to the aperture in the valve, D, or in the valve-seat alongside of the same, in the manner and for the purpose substantially as herein set forth and described.

41,639.—W. E. Pratt, Iowa City, Iowa, for a Water Elevator:

I claim, first, The combination and arrangement of a movable roller or barrel, E, the bevel-head, Q, the cylindrical portion, x, and the spring, T, with the ratchet-wheel, S, the pawl, W, the shaft, D, the crank, I, and the lever, K, substantially as and for the purpose set forth.

Second, The combination and arrangement of the movable roller or barrel, E, the bevel-head, Q, the cylindrical portion, x, and the spring, T, with the rope, F, the flat chain, G, the bucket, H, the rods, M M, the valves, L L, and the conductors, P P, substantially as and for the purpose set forth.

41,644.—Charles A. Shaw, Biddeford, Maine, for a Gas-Fixture:

I claim an adjustable ring or rings, or an equivalent, in combination with the plug, A, and connector, B, substantially in the manner and for the purposes set forth and specified; and this I claim whether the said plug has a pin arranged in the manner described or not.

41,659.—C. T. Woodman, Boston, Mass., for a Faucet:

I claim, first, The employment of the loosely-fitting elastic globular body, F, in the pipe or tube, B, in combination with the seat, c, and follower, F, substantially as set forth and for the purpose described.

Second, The lateral outlet, G, in combination with the seat, c, elastic ball, F, and follower, E, substantially as and for the purpose described.

RE-ISSUES.

1,605.—John Howarth, Salem, Mass., for a Method of Distilling Coal, &c. Patented Sept. 27, 1859:

I claim distilling coal or other carbonaceous substances for the production of oils, gases, vapors, &c., by passing through the material to be acted upon a current of superheated steam in one body, in a vertical plane, or nearly so, through an upright retort, that is, so that a body of superheated steam shall come in contact with every portion of the said material, as set forth.

I also claim forming oleaginous vapors from coal or other substances yielding pyrogenous oils by passing through the material to be acted upon, air combined with superheated steam, substantially in the manner and for the purposes set forth.

I also claim passing through the material to be acted upon, superheated steam in combination with steam direct from the boiler, for the purpose of regulating the temperature, as set forth.

IRON FOUNDRIES.

MORRIS, TASKER & CO,
PASCAL IRON WORKS,
[ESTABLISHED 1821,]
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Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues,
GALVANIZED WROUGHT IRON TUBES,
ARTESIAN WELL PIPES,
of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.
Gas and Steam Fitters' Tools, &c.
STEPHEN MORRIS,
THOMAS S. TASKER,
CHAS. WHEELER,
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SOUTHWARK FOUNDRY,
FIFTH & WASHINGTON STREETS,
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MERRICK & SONS, Engineers,
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R. D. WOOD & CO.,
MANUFACTURERS OF
CAST-IRON PIPE, RETORTS, &c.
Office, 400 Chestnut Street,
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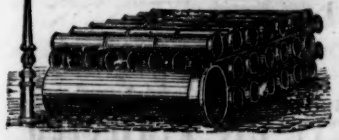

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Sewer Pipes extensively used in Brooklyn, and now introduced in New York, Jersey City, Newark, Hartford, Albany, and other localities, from 3 to 24 inches in calibre.
Water Pipes, lined and coated with Cement mortar, ready for laying and back filling, and can be tapped like cast-iron pipes, which they excel in durability, discharge, and economy.
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A. CARR, MANUFACTURER AND DEALER IN WROUGHT AND GALVANIZED IRON PIPE, BRASS COCKS, VALVES, &c., and all descriptions of FITTINGS FOR STEAM, WATER and GAS,
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FLORENCE IRON WORKS.—The subscriber is prepared to execute orders and make contracts for Cast-Iron Water and Gas-Pipes, from 2 inches to 48 inches in diameter; also, Retorts, Bench-Castings, Branches, Bends, and all Castings for Water or Gas-Works. Pipes and Castings coated with Smith's Patent Coal Tar Varnish to prevent corrosion.
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F. LUNKENHEIMER'S
ADJUSTABLE
GAS-BURNER.
Patented Sep. 8th, 1863.
This burner will give a good steady light under irregular pressures, and can be regulated to any size of light, thus saving gas. It will not clog up, and prevents blowing.
Orders will be promptly filled by addressing the Patentee, at the Cincinnati Brass Works,
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F. LUNKENHEIMER.

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And Importer of SCOTCH TIPS,
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For Lighting and Heating Purposes.
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GAS-BURNERS,
Regulated to burn without noise or fluttering at sixth-tenths to eighteen-tenths pressure. Last twenty Scotch tips. Price from 8s. to 40s. per gross; liberal allowance to wholesale buyers. Any size for any gas (coal, wood, or cannel) screw either taper s/8, s/4, or plug.

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THE NEW YORK GAS-LIGHT COMPANY are prepared to receive offers for their entire production of COAL TAR for one year, commencing June 1st, 1864, to be delivered at their Works, foot of 21st street, East River.
Also, AMMONIACAL WATER and GAS-LIME for sale by contract, or otherwise.
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I WOULD CALL THE ATTENTION of Gas Companies and the public generally to my Improved Method for Making Gas from Wood. The Gas made by this process costs from 35 to 40 per cent. less than any other Gas, and the light is at least 10 per cent more brilliant than that from coal. I have completed the erection of Works for the New Rochelle Gas-Light Company, and their works are now in successful operation. I am prepared to give estimates for the erection of Gas-Works, or to alter coal or resin works, at a small expense. Any information can be obtained on application to the Patentee,
MARK LEVY,
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18-INCH PIPE
For Sale.

WE HAVE ON HAND ABOUT 4,200 Feet of New Cast-Iron Socket-Pipe (18-inch internal drain), in lengths to lay 12 feet each. Each piece weighs about 1,600 lbs., and has been proved at a pressure of 300 lbs. per square inch. Parties wishing to purchase the whole or a portion of it will please address
O. E. CUSHING, Agt.,
Lowell Gas-Light Company,
Lowell Mass.

GASOMETER FOR SALE.

Capacity, 6,800 feet, 25 feet diameter, 14 feet high, well braced inside, with cast-iron guide frame, balance weights, chains, &c., in perfect order. Cost $1,500. Will be sold, if applied for immediately, for $500.
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CAUTION
TO
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The Conically Slotted Solid Wood Tray was patented 21st October, 1862, by N. O. Hawxhurst, assignee of Wm. Combe, and all persons are cautioned against purchasing such trays of R. G. Hunt, or any other person except the subscriber, as it is a direct infringment of said patent. The following companies are now using these trays.
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Gas Fitting in all its branches.
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WHEREAS, PARTIES IN NEW York are advertising for sale Chloride of Calcium, *for manufacturing Gas-Meter Fluid*. I HEREBY CAUTION any one against using said SALT (*or any other metallic or earthy salt or salts*) in Gas-Meters, as I hold Letters-Patent of the United States, to me granted for the exclusive use of the same.
I also caution any one against purchasing a license, or privilege of using my patent, without it being signed and acknowledged BY ME, and without having first corresponded with A. DOISY, Esq., Cincinnati, Ohio, or myself.
H. P. GENGEMBRE.
Pittsburg, Dec. 21, 1863.

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Analytical and Consulting CHEMIST,
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GAS APPARATUS
Of the most reliable and approved construction manufactured and on hand at the
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This Meter combines
ACCURACY, SIMPLICITY, and
REMARKABLE DURABILITY,
with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.
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Filling Wet Gas-Meters,
Cheaper than Whisky or any other substance.

We have furnished the Cincinnati Gas and Coke Company 300 barrels Glycerin, for filling their wet meters, and are now ready to supply other Gas Companies at the lowest cash prices.
We warrant our Glycerin not to corrode the meter metal, nor to freeze at the lowest ordinary temperature, nor to evaporate.
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It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

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It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

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This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Four Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

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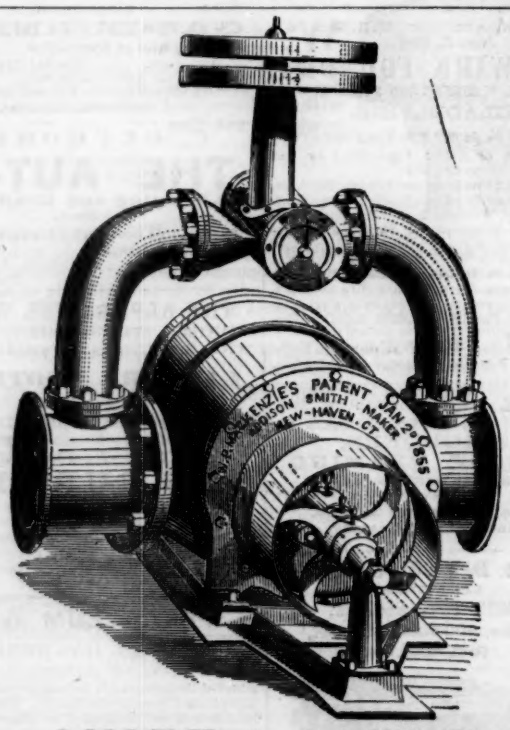

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AND

PATENT COMPENSATOR.

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. uel Address

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And Contractor for Coal or Oil Gas-Works.

Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.

To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

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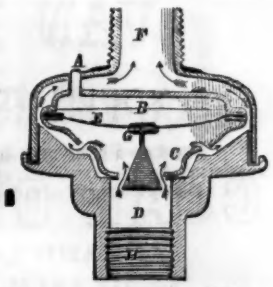
THOMPSON'S

PATENT

AUTOMATIC GAS CONTROLLER.



Notice to Gas Companies and Consumers of Gas generally.

WE RESPECTFULLY INVITE YOUR ATTENTION TO THE FOLLOWING TRUTHFUL DESCRIPTION OF THE construction and operation of this recent and most important invention; its application to every street lamp, and on the fixtures within the works of the Gas Companies, as well as for the use of the general consumer, will be found to effect perfectly and reliably, the object so long sought for, viz: **a perfect control of the Gas under varying pressures, emitting the Gas at the burner without force, and without increase or diminution of quantity, and hence promoting the highest possible illuminating power of the Gas.**

THE AUTOMATIC GAS CONTROLLER

Is designed to occupy the place of the gas-burner. Within the circumference of a small cylinder, below the burner, is placed a conical valve, attached to a movable diaphragm, the valve and valve seat is proportioned, so that under a supply of Gas, varying in pressure from four-tenths to five inches, the burner will continue to produce the same consumption and development. The unerring accuracy of movement of the Diaphragm at every change of pressure, whether gradual or sudden, and its positive control of the valve which admits, by its proportionate increased or diminished aperture, the same unvarying amount of Gas, has elicited the unqualified approbation of engineers and other experts in the profession.

The simplicity of its construction, and materials used, are a sure guarantee of its durability and continued successful operation. They afford to the consumer of Gas the advantage of a **superior light, with the greatest possible economy**; and for the Gas Company, they control the Street Lamps, affording a more satisfactory light for the public, without waste.

The public are invited to witness its operation, at the Office of the Company; and samples will be sent to Gas Companies for experiment, on application by letter or otherwise.

G. W. THOMPSON & CO.,

Office, 627 BROADWAY, (up stairs.)

A. L. BOGART, AGENT, 592 BROADWAY,

New York.

We are permitted to refer to the following Gentlemen, who have thoroughly examined our Gas Controller:

GEO. H. KITCHEN, Inspector of Gas Meters, 561 Broadway.
CHAS. ROOME, President Manhattan Gas Company.
J. H. ADAM, President New York Gas Company.
PETER COOPER, Cooper Institute.
JOHN A. DUFF, Olympic Theatre.

THE AMERICAN METER CO.,

Organized under the General Manufacturing Laws of the State of New York.

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE PRESIDENT. RICHARD MERRIFIELD, SECRETARY AND TREASURER.

TRUSTEES.

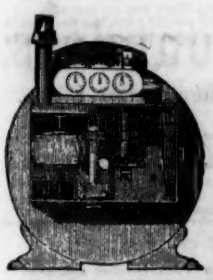
SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS and REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy, and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

340 WEST TWENTY-SECOND STREET, NEW YORK,
ARCH AND TWENTY-SECOND STREETS, PHILADELPHIA,
1 BARRETT STREET, BOSTON, will meet with prompt attention.



HARRIS & CO.,

(LATE HARRIS & BRO.,)

N. W. CORNER 13TH & CHERRY STREETS,

PHILADELPHIA,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

METER PROVERS, CENTRE SEALS, PHOTOMETERS, GOVERNORS, STATION METERS, EXPERIMENTAL METERS, PRESSURE REGISTERS, PRESSURE GAUGES, &c., &c.

The firm of HARRIS & Co., which comprises the senior partner and only practical Meter maker of the late firm of HARRIS & BRO., will continue the manufacture of Meters, &c., of every description, and will guarantee to furnish an article of Meters equal to the best in the country, at the lowest rates, and combining the latest improvements with great durability and accuracy. The reputation of the Meters of the late firm of HARRIS & BRO. is confidently appealed to. All our Meters are tested by a sworn Inspector. TERMS EASY.

ROBBINS' PATENT GAS AND WATER JOINT.

THE PROPRIETORS of this unrivalled joint are now prepared to introduce it to general use, and to guarantee that, in all respects, it will fulfil perfectly all the requirements of either water, gas, or steam. It is a joint which remains in all situations absolutely tight.

The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 3.

Fig. 1.

Fig. 2.

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid, and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

TESTIMONIALS.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes, was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough test of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apart and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department, I can testify to the results as stated by Col. A. J. White and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 23d, 1863.

Gentlemen.—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint," in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.

For further information, or for prices and terms, which will be very reasonable, apply to

R. C. ROBBINS & CO.,
No. 197 GREENWICH STREET, NEW YORK.